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NAC General Catalogue

B.nano[®]

Foamest[®]

About NAC

If you see a small factory at the end of a green mountain in Seki-shi, Gifu Prefecture, that is NAC Co.
 With Monotransfilm, a micro-nano bubble generator Foamest® and the tiny bubbles B.nano produced by its unique technology, the company is changing the way the world thinks about bubbles one after another.

Monotran film

Monotrans films are nano-porous films manufactured by Nac. By creating stripes of sponge-like porous areas on the cross-section of the resin film, special functions such as viewing angle control and gas permeability can be achieved. Foamest is made using this gas transmission function.

、Foamest



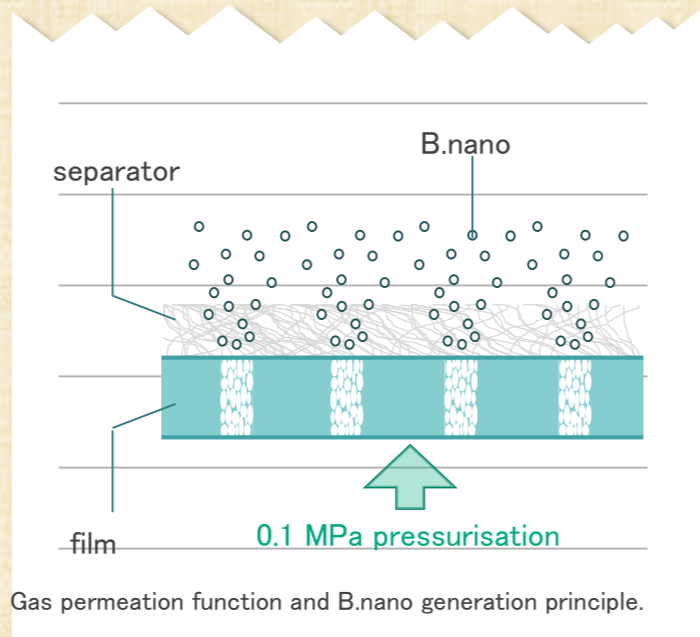
フォーメスト

Foamest®series

Micro-nano bubble generators, deployed using the gas permeability function of monotransparent film. Foamest®シリーズ。Micro-nano bubbles (B.nano) can be easily generated at a pressure of around 0.1 MPa.

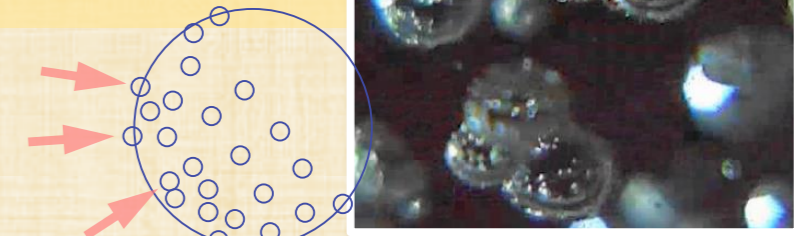
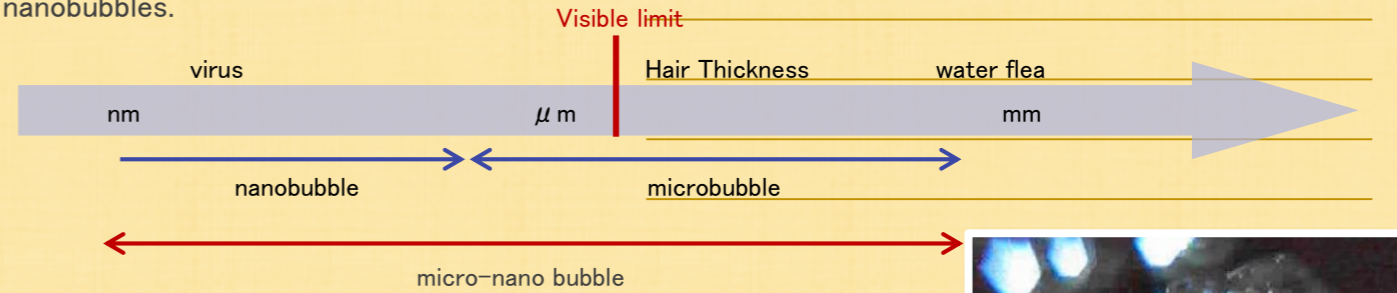
Foamest®Series features

- ① Easy to change equipment length !
So ... a wide range of series line-ups
- ② Clogging resistance !
Can be used in water with high suspended solids
- ③ Pressure-feeding bubbles !
So ... high water pressure / can be used in deep water.
- ④ It's not just air !
B.nano such as carbon dioxide and ozone can also be generated if gas cylinders are used.



What are micro-nano bubbles?

Microbubbles are bubbles with a size of 1-1/1,000 mm.
 Nanobubbles are bubbles with a size of 1/1,000 to 1/1,000,000 mm.
 Micro-nano bubbles are a mixture of bubbles ranging from microbubbles to nanobubbles.



Micro-nano bubbles attached to milli-bubbles.

Caution!
 Nanobubbles are invisible to the naked eye!

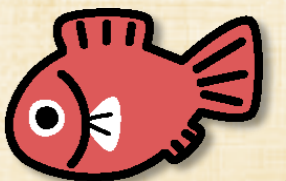
ビナノ

B.nano® indicates word or phrase being defined

Foamest The nanobubbles produced by the series were recognised for their long-lasting and long-term shelf life and earned the trademark B.nano

B.nano®Features

- ① High internal pressure !
So ... even in deep water areas with high water pressure, the B.nano can exist without crumbling
- ② Negatively charged !
So... nanobubbles repel each other and do not stick together, but are well absorbed by positively charged dirt.
- ③ Very long-lasting !
They don't rise to the surface very easily because they move more Brownian motion than buoyancy, and some have been recorded to have lasted over three years!
- ④ Good reactivity !
The large specific surface area ensures that the chemical reactions that take place on the surface are efficient.



Field-specific information

agricultural

Keywords !

Growth promotion / Increased rooting / Seedling development
 Fruit trees / Vegetables / Soil tillage / Hydroponics
 Increased yield / Increased sugar content / Improved taste
 Reduced use of pesticides and fertilisers / Microbial power
 Organic farming / Improved soil / Cleaner plumbing

Foamest Column Series	p.6
Foamest Line Series	p.10
Foamest O3G	p.13

B.nano penetrates into hard ground and improves the field from the soil. It activates micro-organisms in the soil, improves plant rooting and increases the effectiveness of fertilisers. It is particularly effective when used during the seedling stage. Of course, it can be used in both hydroponics and soil cultivation.

Diluting pesticides with B.nano water also allows them to penetrate areas that are often missed, such as at the base of leaves and in the spikelets. This increases the effectiveness and consequently reduces the amount of pesticides used.

cultivation

Keywords !

Land-based aquaculture / Sea-based aquaculture / Deep-sea / Lakes
 Increased dissolved oxygen / Prevention of acid deprivation / Reduced mortality
 Fish fry / shellfish fry / shrimp fry
 aquatic plants / Plankton / Water purification
 Red tide prevention / Stress-free / Transport
 Ornamental fish

Foamest Column Series	p.6
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Foamest The Column series is good at generating air bubbles from deep water. It can be used in deep water areas such as seas and ponds without problems. If you create a good water flow, the bubbles will be effective even in large areas, and you can hope for an improvement in the environment that goes beyond a simple oxygen supply. B.nano is particularly suitable for stress-sensitive fry and shrimp, as it does not create convection currents.

However, algae also become more energetic, so countermeasures may be necessary.

industrial

Keyword

Parts cleaning / Wastewater treatment / Oil-water separation
 Pipe cleaning / odour reduction / grease traps
 SS / n-Hex / Anti-oxidation / Precipitation
 Plating / Semiconductor / Cutting / Grinding
 Neutralisation / Bio / Cost reduction
 Nano-order / Reduction of chemicals / Surface modification
 Oxidation treatment / No convection / Different from aeration

Foamest Column Series	p.6
Foamest Line Series	p.10
Foamest O3ZF	p.14

The penetrating power and negative charge of B.nano are at work in the industrial sector. For cleaning, B.nano penetrates into nooks and crannies and removes even nano-order dirt. In wastewater treatment, B.nano captures any fine particles with its negative charge, helping to purify the water and reduce the treatment burden. This contributes to cost reduction.

Only the B.nano can do this, as it does not cause convection. It is ideal for grease traps that must not be agitated and industrial products that could be damaged by water flow.

Other

Keywords !

Vegetable cleaning / Food with foam / Pipe cleaning
 Public bathrooms / Cleanliness / Legionella
 Biofilms

Sterilisation / Cleaning / Easy / No odour
 Cutlery / Ozone in a tub / Clean
 Handwashing / at the dentist / at home

Foamest Line Series	p.10
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Foamest O3ZF	p.13
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Foamest flat	p.13
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Various dedicated machines	p.18
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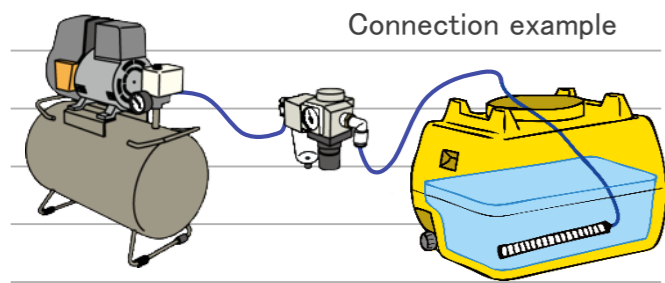
B.nano expands its uses with your ideas !

Products

Foamest®column

Foamest Basic form of the series. A special film is used to produce B.nano simply by supplying pressurised gas. Wide range of sizes available. You can select the optimum length and diameter to suit your location. In addition, customised specifications are also available.

The FP series without cover and the KFP series with cover are available.



Once the compressor is fitted with a regulator and connected to the column, you can then douse the tank.

If you use a cylinder instead of a compressor, you don't even need a power supply.

Easy and simple nanobubble generation.

Please use a compressor that is oil-free or with an oil mist filter.

How to use the column series

agriculture

Can be used in soil or hydroponics, helps plants absorb nutrients and promotes growth. Especially if used during the seedling stage, it helps to grow strong, vigorous crops with excellent rooting. Can be mixed with pesticides to improve efficacy and reduce dosage.

cultivation

For use in aquaculture tanks to prevent acid deprivation of organisms. The soft foam minimises stress on the organisms and promotes growth while reducing mortality. Also activates bacteria in the filter and promotes water purification.



Appearance of bubbles (FP20-300)

factory

Mixing foam in the wastewater treatment tank separates suspended solids and oil in the wastewater, reducing the load on the treatment plant. It also cleans and removes dirt stuck in the tank and pipework.

FP Series list

type	FP20-70	FP20-150	FP20-300	FP40-300	FP40-670	FP40-1000
Body size mm	φ 20 × 70	φ 32 × 150	φ 32 × 300	φ 57 × 300	φ 57 × 670	φ 57 × 1000
Weight g	40	250	320	1200	2270	2420
L	20	100	200	500	1000	2000

※Other special sizes on sale! For more information, go to p. 8.→

KFPSeries list

type	KFP20-150	KFP20-300	KFP40-300	KFP40-670	KFP40-1000
Body size mm	φ 62 × 150	φ 62 × 300	φ 96 × 300	φ 96 × 670	φ 96 × 1000
Weight g	410	480	2400	3270	3500
Guideline for water quantity L	100	200	500	1000	2000

common specification

Supply pressure MPa	0.05~0.2 ※The higher the pressure, the larger the foam
power	unnecessary ※Needed for compressors.
Temperature range	0~40°C no freeze
Available fluids.	Fresh water, pure water, seawater, other acids and bases, etc. *Please contact us for more information.
Gases available	Dry compressed air Oxygen., Carbon dioxide, nitrogen, etc.

Caution!

When not in use, pull it out of the water and leave it to dry. Do not leave in water. Do not damage the film on the surface of the product. Do not use in water with oil. Pipe with care to avoid pressure loss.



Column Series selection tips

- For circulating water, select a column based on the total volume of water circulating, not the size of the tank.
- If the foam is easily consumed (e.g. by the presence of living organisms), use a column one size larger.
- For water that flows through in one pass, select the column based on the water flow rate. Other special specifications can also be manufactured. Please contact us if you require chemical, heat, oil or food resistant versions.

whatever the field!

Products

Customised and made-to-order products

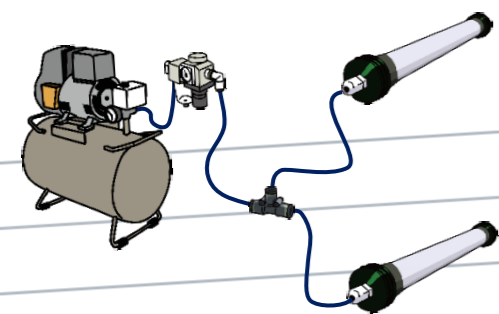
Foamest The series can be customised to suit your environment. Please feel free to contact us to change to oil-resistant or chlorine-resistant versions, change the constituent materials (only some of them), change the type of fittings, etc.

Foamest 201

Foamest When the Foamest series is used in oily water, the oil soaks into the monotrans, reducing their bubble generating capacity. The Foamest201 overcomes this weakness.

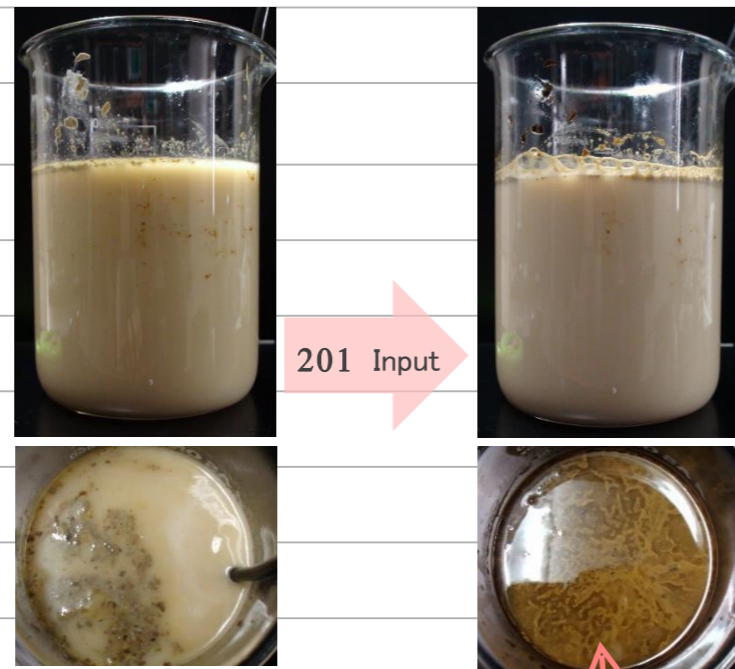
When placed in the coolant tank of a machining centre, the Foamest201 can keep oil and swarf mixed with cutting water adhering and floating, keeping it clean, and preventing the growth of putrefactive bacteria, thus reducing odours and improving the working environment. The water mixed with B.nano also reduces friction between the blade and workpiece, thereby improving cutting efficiency and contributing to cost reductions throughout the plant.

Type	201-150	201-300
Body size mm	φ 32 × 150	φ 32 × 300
Specification	Oil-resistant	
Destination of use	Cutting and grinding machines, etc. Coolant tanks.	



One per coolant tank (200-300 litres)
1 bottle per coolant tank (200-300 litres).

Results of foam feeding tests into coolant



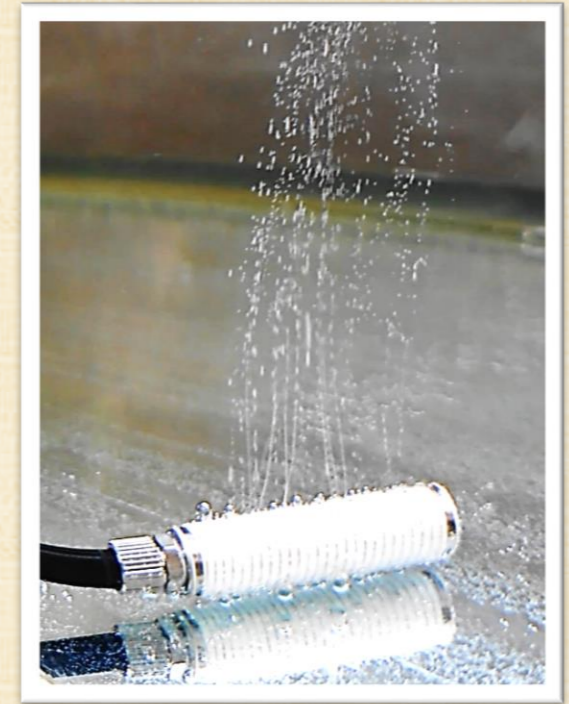
Oil build-up on the surface of the water !

Foamest Column FP10-50

The ultra-small Foamest is the answer to the call for a B.nano in plastic bottles. Connect it to a commercially available oxygen gas cartridge and you have freshly prepared oxygenated water on the spot.

※This product is a joint development and is only available from selected distributors.

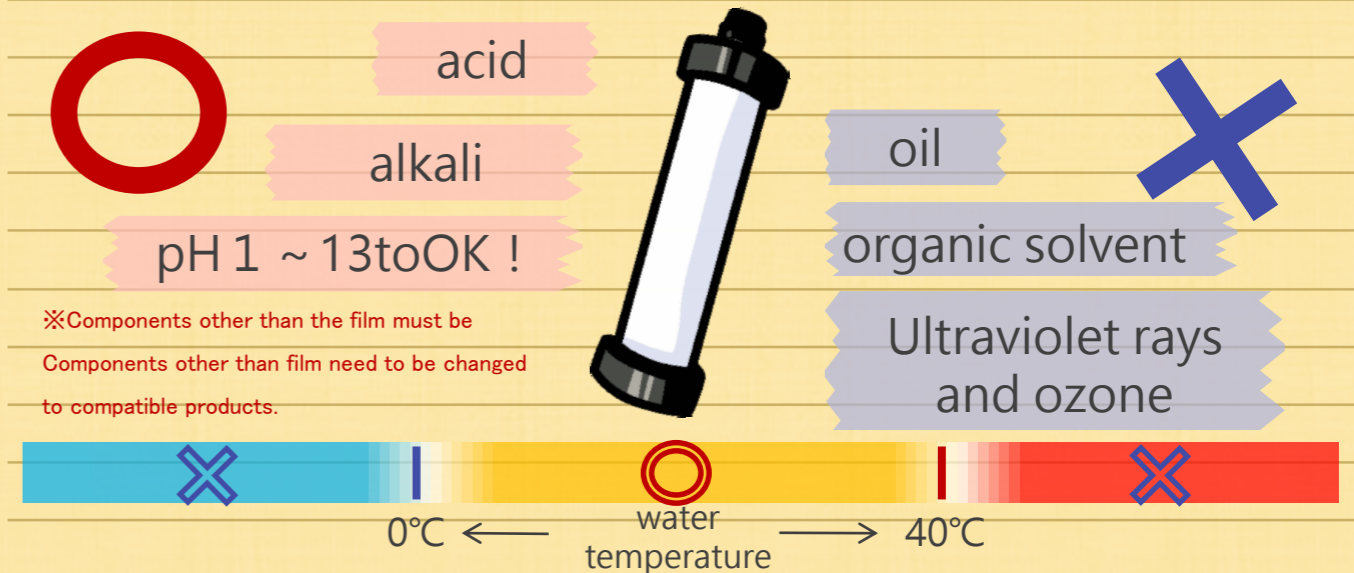
Type	FP10-50
Body size mm	φ 10 × 50
Specification	30
Destination of use	Small containers such as plastic bottles and beakers.



Foamest durability

Foamest The monotransparent film used is made of PP (polypropylene).

The PP has excellent chemical resistance and can be used against most acids and alkalis, but it is weak against oil, organic solvents, and ultraviolet rays.



Also, since PP is a resin, it will deform at high temperatures. In principle, we recommend using PP in an environment up to 40°C.

If the environment is free from oil, organic solvents, and ultraviolet rays, the product can be used in environments other than fresh water by changing parts other than the film to compatible products.

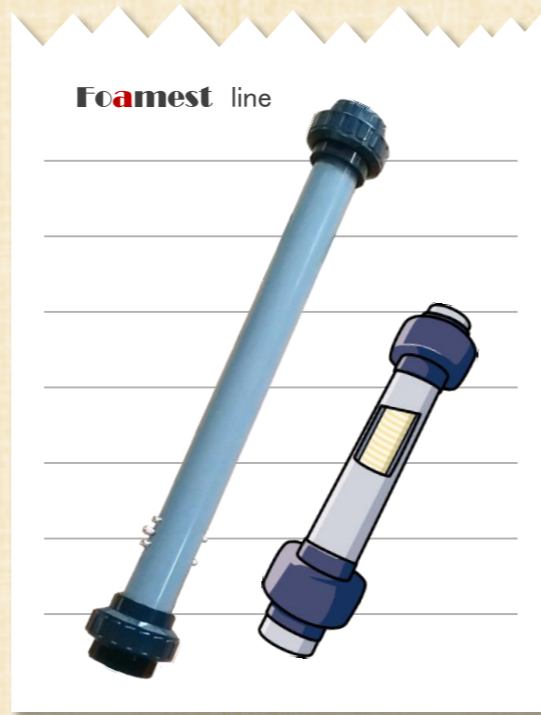
Products

Foamest®line

The **Foamest** line series can be installed directly in the piping.

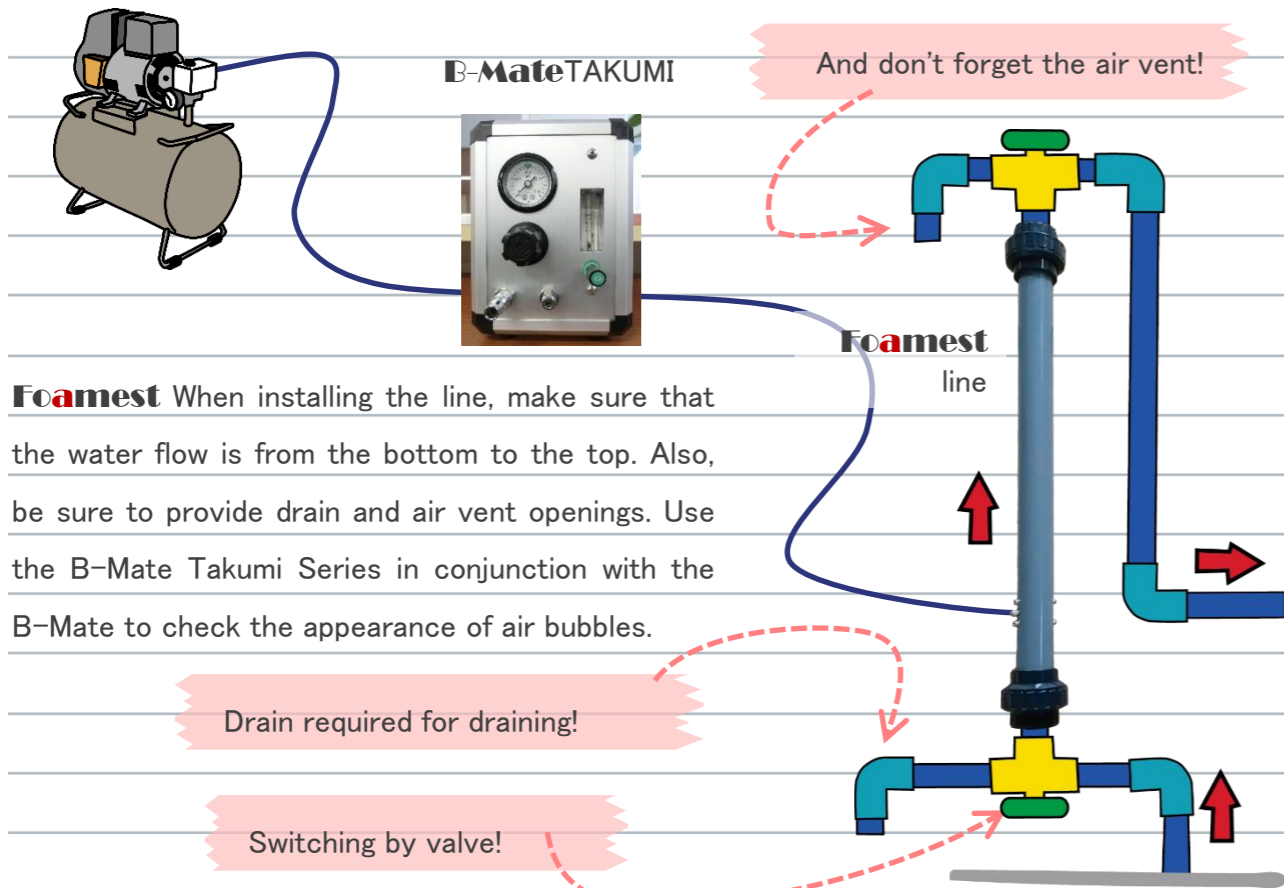
Since it does not require a tank or water tank, it can be installed even in small spaces. With the help of water flow, the **Foamest** Line Series can produce more uniform and finer bubbles than the **Foamest** Column Series.

Also, while a separator was required for the Column Series, it can be eliminated for the Line Series. This is the best choice for those who are considering introducing the **Foamest** Column Series into the food, medical, and other fields where contamination by foreign matter is a concern!



Example of piping

Device is oriented vertically
From bottom to top !



Foamest When installing the line, make sure that the water flow is from the bottom to the top. Also, be sure to provide drain and air vent openings. Use the B-Mate Takumi Series in conjunction with the B-Mate to check the appearance of air bubbles.

Drain required for draining!

Switching by valve!

How to use the Line Series

agriculture

When installed in the piping of pumped water, B.nano can be distributed throughout the farm. In addition to increased yields, pesticides and fertilizers can be reduced, leading to a significant increase in profits.

plant

B.nano cleaning can be incorporated into the parts cleaning line. The mechanism is different from high-pressure cleaning and ultrasonic cleaning, and floats and gently removes contaminants. It is effective for precision equipment and other areas requiring nano-order cleaning, or where the amount of cleaning agent needs to be reduced.

Other

If placed in a food production line, it can be used to produce food with foam. In bathroom circulation lines, it eliminates biofilms in the pipes, eliminating the habitat of legionella bacteria and keeping baths clean.



Line series main unit specifications list

	LN40-25	LN40-20	LN50-30	LN50-25
Piping nominal size	40A	40A	50A	50A
Recommended pipe size	25A	30A	30A	40A
Recommended water flow rate L/min	100	120	150	200
Water pressure used MPa	~0.3	※If water pressure is high, install a pressure reducing valve.		
Body size	40A × 640	40A × 640	50A × 784	50A × 784

Caution !

Beware of excessively strong water pressure and water hammer.

Be sure to install a drain and air vent.

Be sure to install the B-Mate skillful because you cannot see the bubbles.

Options such as peripheral piping, mounts, automatic control of each valve, control interlocking with B-Mate Takumi (limited to Takumi Ex), and special specifications such as chemical, heat, and food resistant, as well as custom sizes are also available. If you consult us before purchasing, we will propose the most suitable installation plan. Please contact us.

We are currently developing a new compact (25A x 200) stainless steel specification model. If you are interested, please contact us.

B-MateTAKUMI also
checklist !

Products

Foamest®O3series

Foamest03 is a series of Foamest series especially designed for ozone compatibility. Stainless steel, fluoroplastic, and other materials with excellent ozone resistance are used as materials.

By using B.nano for ozone gas, it becomes possible to handle ozone effectively and more effectively, which was difficult to handle with the gas as it is. Ozone gas, ozone water, and ozone B.nano are all named ozone, but their properties and safety are completely different.

Ozone gas, ozone water, and ozone B.nano

① ozone gas

As the name implies, ozone is a gaseous form of ozone. It is a **dangerous** substance because it has a distinctive odor and in high concentrations can damage the respiratory system. It lasts for several hours.

Because it is a gas, it is easy to fill a space with it, and it is sometimes used in hotels for deodorization.

② ozone water

Ozone gas dissolved in water. Manufacturing methods vary, but the most common method is to aerate water with ozone gas. Therefore, the ozone gas concentration increases around the manufacturing equipment, which is very dangerous.

While ozone dissolved in water is more reactive and more effective than gas, it is less persistent and disappears in a few minutes.

③ ozone B.nano

Ozone gas is introduced into water as B.nano.

Since B.nano has a strong ability to stay in water, ozone is not released into the atmosphere. The ozone concentration in the atmosphere is about 0.01ppm, which is very safe.

B.nano is also highly effective in increasing penetration and cleaning power, and has been confirmed to have an amazing lasting power of more than one month.

figure	gas
safety	×
durability	△
effect	△

figure	water
safety	△
durability	×
effect	○

figure	foam
safety	◎
durability	◎
effect	◎

Foamest®O3G

CT type FoamestO3. The power of the water flow using a pump achieves even finer and more uniform foam than the column type.

The ozone generator and pump are integrated into a single cart, assuming that it can be operated while moving, such as on a farm. Customization according to the location and method of use is also available.

power	AC100V 50/60Hz
Gases used	Industrial Oxygen(99.6%)
Supply gas pressure	0.3~0.5MPa
Environmental conditions for use	Temperature 5 to 35°C, humidity 90% R.H. or less No dew condensation or freezing

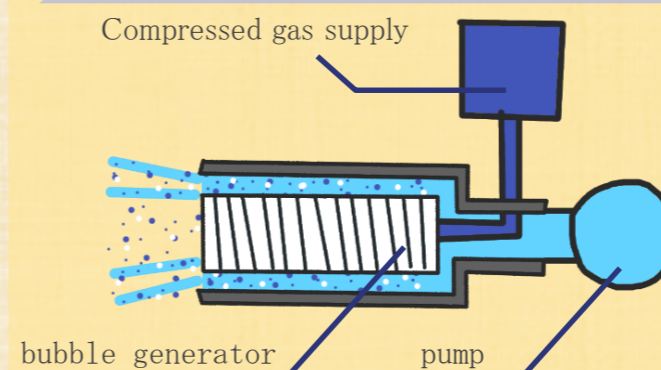
How to use O3G

agriculture

Ozone B.nano is introduced into the irrigation tank. It activates the soil at the same time as watering and promotes plant growth. In addition, it also removes dirt in the piping.

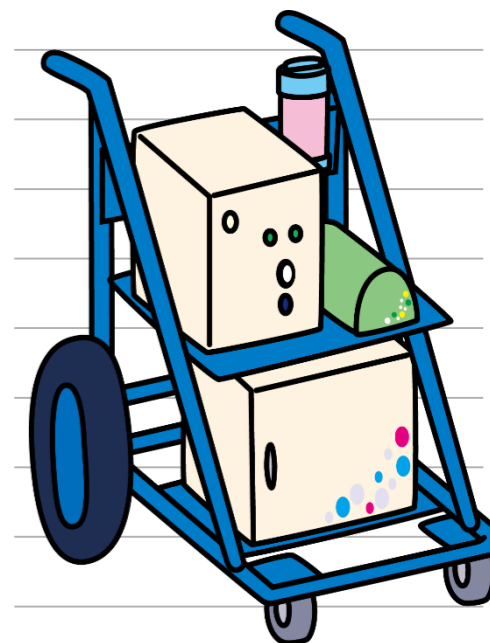
It kills two birds with one stone. Furthermore, spraying ozone B.nano water will wash away bacteria on leaves and make them healthy. It is also expected to reduce the use of pesticides.

CT type (What is water flow cut-off nozzle type?)



Bubbles from the bubble generator are cut by the flow of water before they become large. This is NAC's unique nozzle that can generate uniform and fine bubbles.

Foamest equipped with this nozzle is called the CT type. Patented in Japan and the U.S.



FoamestO3G

CTnozzle



Products

Foamest®O3ZF

The FoamestO3 is simple and compact, yet highly functional. It combines the Foamest flat as the bubble generating part and the main unit that generates ozone. The small size can easily be placed on a desk or under a shelf, making it ideal for use in small stores and laboratories.

power	AC100V 50/60Hz
Gases used	Industrial Oxygen (99.6%)
Supply gas pressure	~0.2MPa
Environmental conditions for use	Temperature 5 to 35°C, humidity 90% R.H. or less No dew condensation or freezing



Foamest O3ZF

Foamestflat

Standard Unit TF80-2-200



Foamest®flat

This is a disk-shaped flat B.nano generator. As with the column, B.nano is generated simply by supplying pressurized gas. It is characterized by softer bubbles than the column and almost no convection.

It is mainly used for ozone B.nano generation, but of course, B.nano generation is also possible with other gases. Because it is flat and small, it is especially useful in shallow water.

model	TF80
Body size mm	φ 80x20 ※The standard is one set of two.
Supply pressure MPa	0.05~0.2
Temperature range	No freezing (*25°C to 25°C when used with ozone gas)
Available liquids	Available liquids Fresh water, pure water, seawater, other acids and bases, etc. *Please consult us for details.
Available gases	Dry compressed air O ₂ , CO ₂ , N ₂ , ozone, etc.

Appearance of bubbles (Foamestflat)

How to use O3ZF

plant

When placed in a "grease trap" that treats wastewater, it promotes oil-water separation. Because it is a soft foam that causes almost no convection, it does not roll up sediment and minimizes the risk of oil spillage.

In addition, the ozone also helps to remove stubborn dirt stuck to the treatment tank and piping and clean them, and the ozone also helps to prevent odors, so both the treatment tank and workers can expect pleasant effects.

Other

Ozone B.nano can be generated even in a small, tarry-sized tank, and since the ozone concentration in the atmosphere is negligible, it is not a concern even when running on a workbench. For places where you want to use a small amount frequently, such as sterilizing medical instruments and cutlery.



Water in grease trap
左 | O3ZF Before
右 | O3ZF After



Caution!

Oxygen cylinders or oxygen concentrators are required for use.
Always ventilate the room during use.
Use clean, cold water.
This is a high-voltage device and must be handled with care!

Effective against a variety of bacteria!!

Ozone sterilization test data (extracted from data from the Preventive Health Research Institute, Ministry of Health, Labour and Welfare)

type	Ozone concentration (ppm)	Time	extinction ratio (%)
Escherichia coli	0.96	5second	100
staphylococcus	1.08	5second	100
Pseudomonas aeruginosa	1.01	5second	100
Welch bacillus	0.96	5second	100
influenza virus	0.96	5second	100
Chicken encephalomyelitis virus	0.72	5second	100
canine hepatitis virus	1.20	5second	100
canine barbovirus	0.96	5second	100
coccidium chicken	1.92	5second	100
mold	0.3~0.5	19second	99.9
hay bacillus	0.3~0.5	30second	99.9

Products

B-MateTAKUMIseries

The **B-Mate** takumi series of gas regulators can monitor and adjust gas discharge and supply pressure in a single hand.

Installed in place of a regulator, it can be used to check bubbles in unseen places, maintain a constant amount of bubbles, and act as a behind-the-scenes helpmeet for the successful use of the **Foamest** series.



B-Mate takumi simple

Takumi simple

If you are in a place where you can check frequently, choose the simple manual type. Since it does not require a power supply, it can be placed anywhere.

Takumi control

Control for **Foamest** in locations where water pressure does not vary, ensuring a constant gas discharge flow rate and supporting stable bubble generation.

Takumi Ex

Ex is recommended for use where water pressure changes drastically or where water depth is deep. Not only the discharge flow rate but also the supply pressure is automatically adjusted to match the external pressure, so it is safe even in harsh environments.

B-MateTakumiSeries List

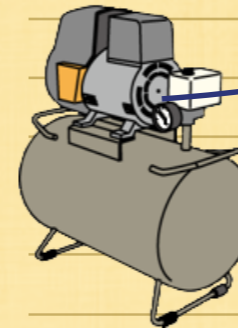
※1 Please inform us of the gas flow rate to be used when ordering

name of product	B-Mate Takumi simple	B-Mate Takumi control	B-Mate Takumi Ex
system	manual	semi-automatic	totally automatic
Pressure adjustment	regulator	certain	automatic
Pressure check	Analog pressure gauge	Digital pressure gauge	Digital pressure gauge
Flow rate adjustment	needle valve	automatic	automatic
Confirmation of flow rate	Float type flowmeter	mass flow meter	mass flow meter
power	unnecessary	AC100V	AC100V
Gas supply pressure (MPa)	0 ~ 0.4	0~0.6	0~0.9
Recommendation Foamest	Foamest column / Foamest flat		Foamest line
Location	Indoor / Outdoor *Special specifications are available for outdoor use. Please request in advance.		

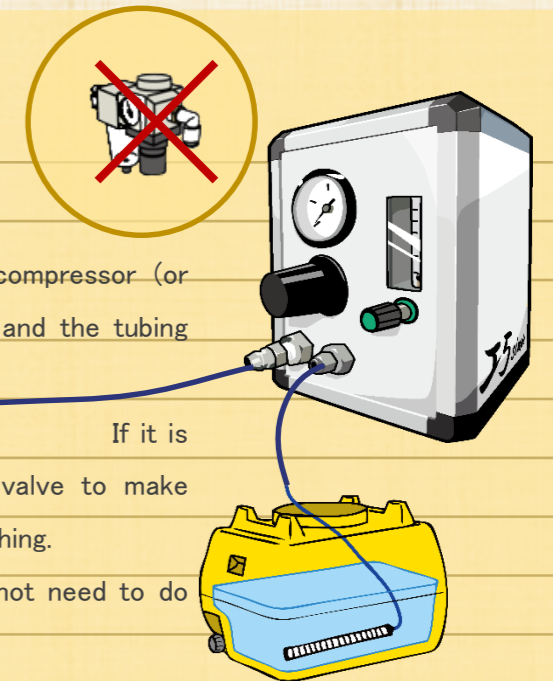
B-Mate Takumi treatment

The **B-Mate** Takumi is used in place of a regulator.

Simply connect the tubing from the compressor (or cylinder) to the IN side of the clever, and the tubing from the OUT side to the Foamest.



If it is simple, use the regulator and needle valve to make adjustments, if it is control or Ex, do nothing. If the control or Ex is simple, you do not need to do anything to complete the adjustment.



How to choose a Takumi

Foamest and how to adjust Takumi What is the combination?

	column	flat	line
manual		①	
auto	②	③	④

What is the depth of the water?
0~10m 10m~

What is the water pressure?
0~0.1MPa 0.1MPa~

B-MateTakumi Control

B-MateTakumiEx

B-Mate Takumi simple

Flow adjustment range is determined according to the amount of bubbles generated by **Foamest**. Please let us know the type and number of **Foamest**.

※When multiple **Foamest** units are installed, only the total value can be adjusted with one clever unit; it is best to install one unit per unit.

In addition, please let us know at the time of order where (indoor/outdoor) and how (direct mounting/bracket/etc.) you would like to have the product installed.

Products

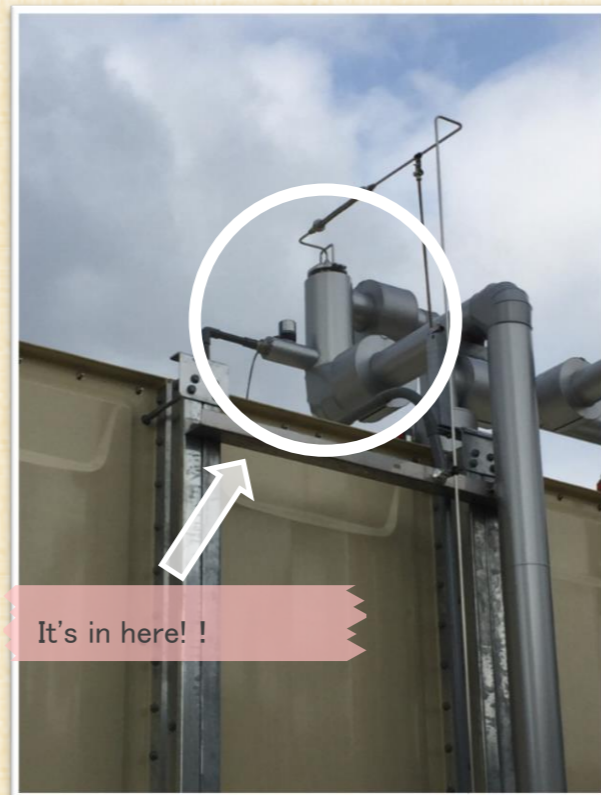
Various Specialized Machines

We also have a number of specialized machines that are tailored to our customers' facilities. Here are some examples.

How do I install it?" "Can we do this?" Please feel free to consult with us. We will be happy to assist you with anything from careful listening to proposals to design.

Groundwater neutralization equipment (carbon dioxide adding equipment)

A power plant is using Foamest to feed carbon dioxide to neutralize highly alkaline groundwater. Stable operation with flow control function



It's in here!!

Foamest line unit for food



Foamest line is composed of PVC and stainless steel. It was installed in a food production line.

The cover is transparent for better visibility and incorporates an automatic flow control function.

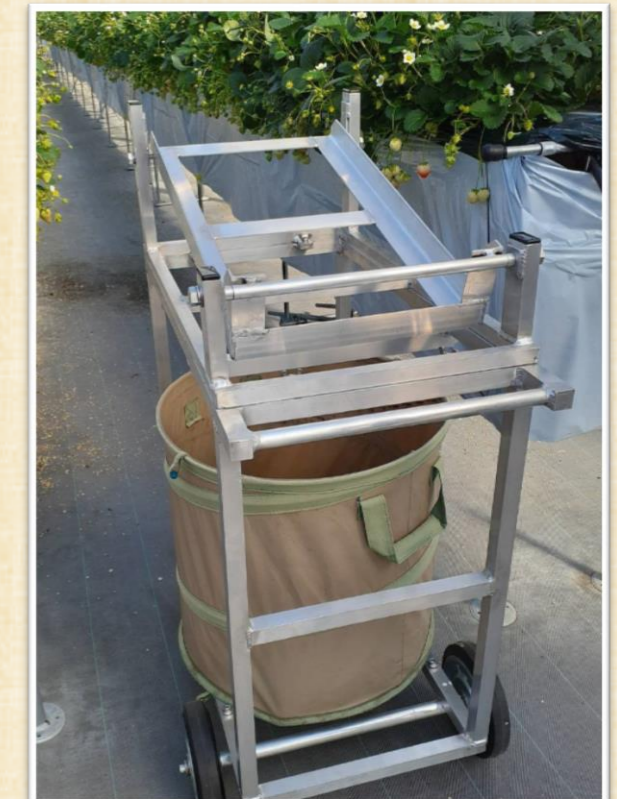


You can see the bubbles. Transparent cover!

In conjunction with pumps Controls valves

Foamest even if not——

Original strawberry harvesting carts incorporating farmers' requests. The farmer was pleased with the "convenient" design.



elevator

Multiple **Foamest** columns were combined into a unit. The columns are also equipped with an automatic lifting function that raises and lowers in accordance with plant operations, and were installed in a wastewater treatment facility.

