

# swim-bed **BIOFRINGE**

Swim-bed BioFringe  
• 9 Patents in Japan • Overseas Patents/USA, Europe (Switzerland, Germany, Italy, France, UK, Holland), Taiwan, and South Korea



## **NET Co.,Ltd.**

Homepage Search Keyword: **BFQCP**

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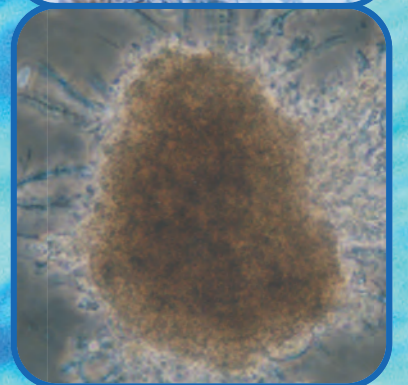
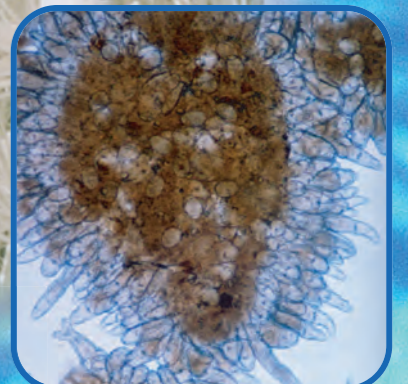
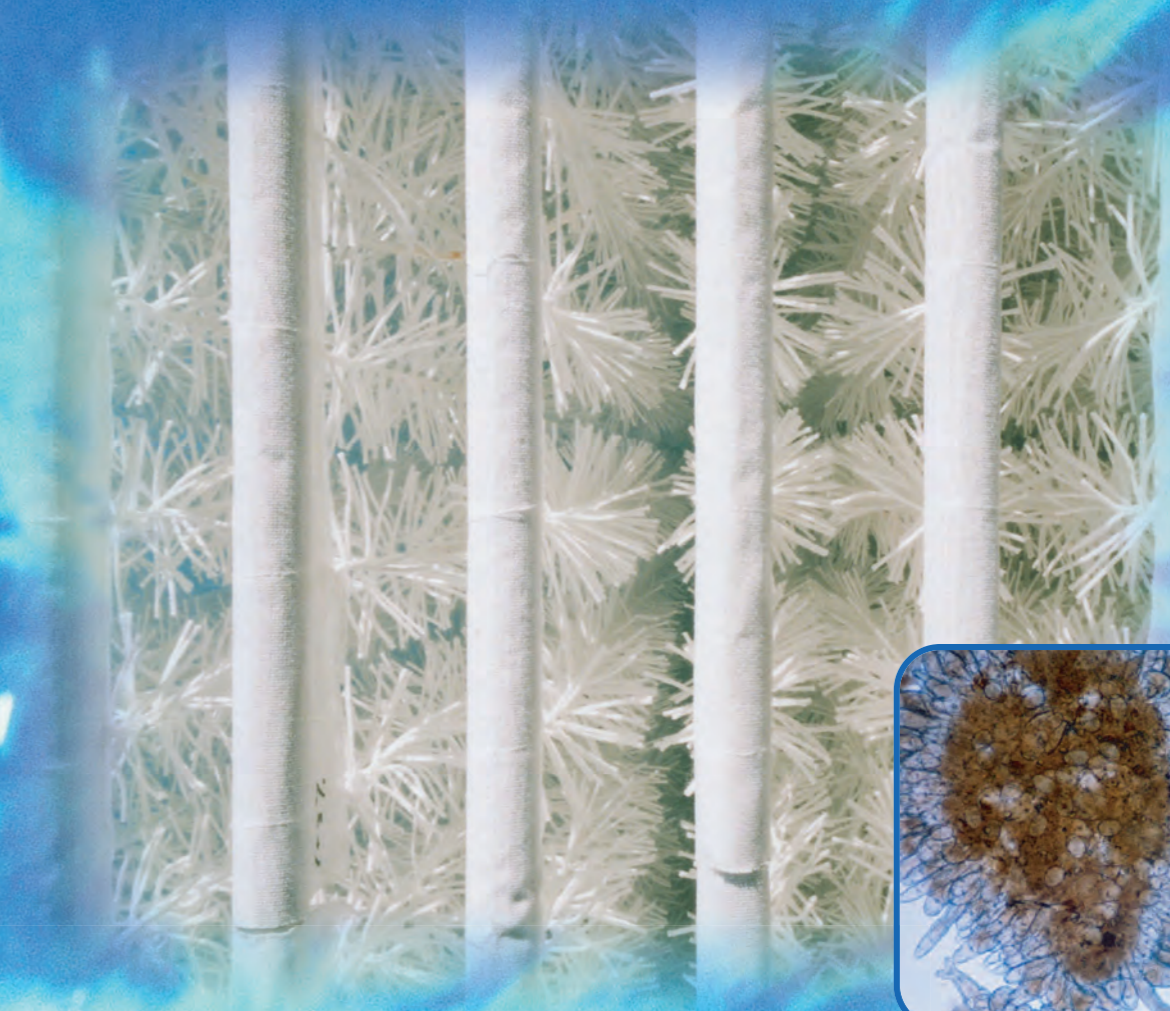
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**Natural law incorporated into the system**  
**Dramatically expands the possibility**  
**of biological treatment**  
**Realizes a natural restoration system**

**NET** NET Co.,Ltd.

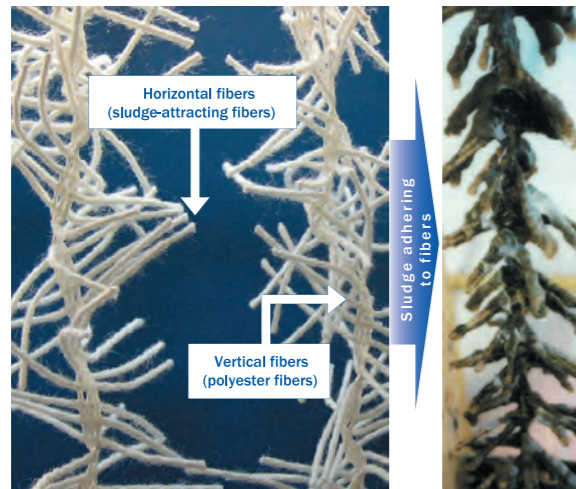
Networking of Engineering and textile processing

Swim-bed BioFringe is a high-performance, generic contact material made of fiber that incorporates natural law.

## 1 Utilizing the potential of the textile industry

### • BioFringe Overview

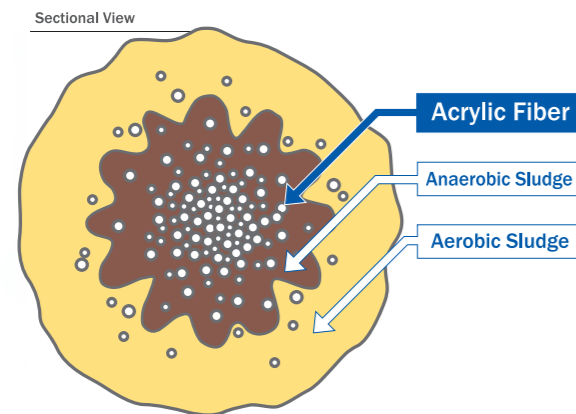
BioFringe is a special acrylic fiber with excellent sludge-adherent properties that projects in all directions. The vertical fibers are made of polyester, and the horizontal fibers are made of a bulky acrylic yarn. Polyester has high tensile strength and excellent water-resistant property, which resists attachment of sludge. However, acrylic has the best hydrophilic properties of all of the synthetic fibers, which makes it easy for sludge to attach.



## 2 Maintains stable adherence of fixed sludge amounts

### • Mechanism for sludge adherence strength

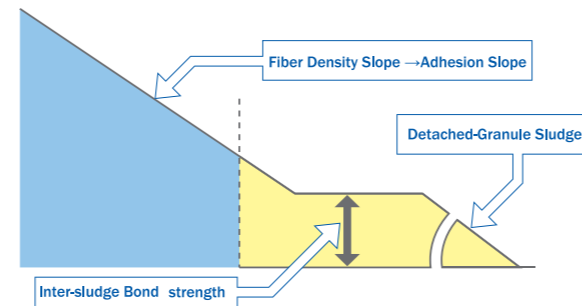
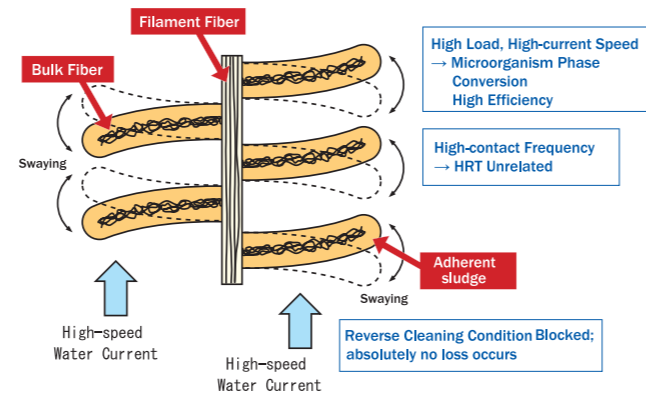
Sludge only adhere to the surface of other types of fiber-based contact materials. However, BioFringe fibers allow the sludge to enter the fiber and become firmly attached; retention times are extended, causing a long food chain to develop.



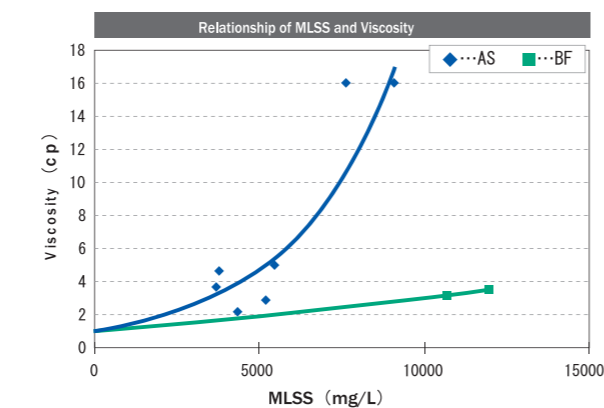
## 3 Exfoliation of Surface Continuous Area

### • View of Sludge Adhesion

As shown in the figure below, part of the sludge enters the fiber and becomes firmly attached. Simultaneously, the surrounding areas with weaker adhesion experience partial exfoliation by the swaying of the fiber and water current. As a result, highly active sludge is exposed on the separated surface, decomposes BOD and accumulates sludge. By repeating the process of separation and accumulation, preservation of highly efficient treatment becomes possible. On the other hand, since sludge in the center area has longer retention time, long food chain occurs and sludge generation is reduced due to autodigestion of the sludge.

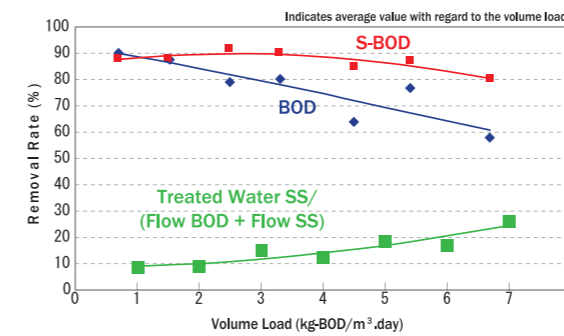


### • Relationship of MLSS, Viscosity, and Block Particle Diameter Distribution



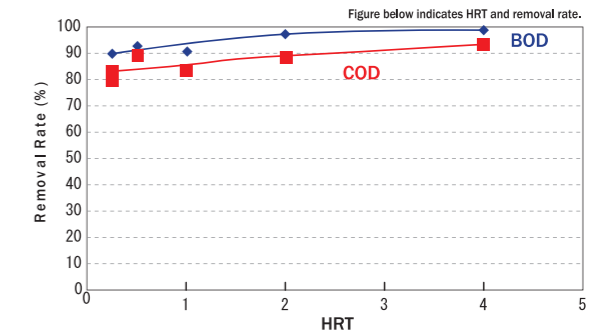
## 4 O Dimension Absorption Treatment

### • Relationship of BOD, S-BOD Removal Rate, and SS Conversion Rate

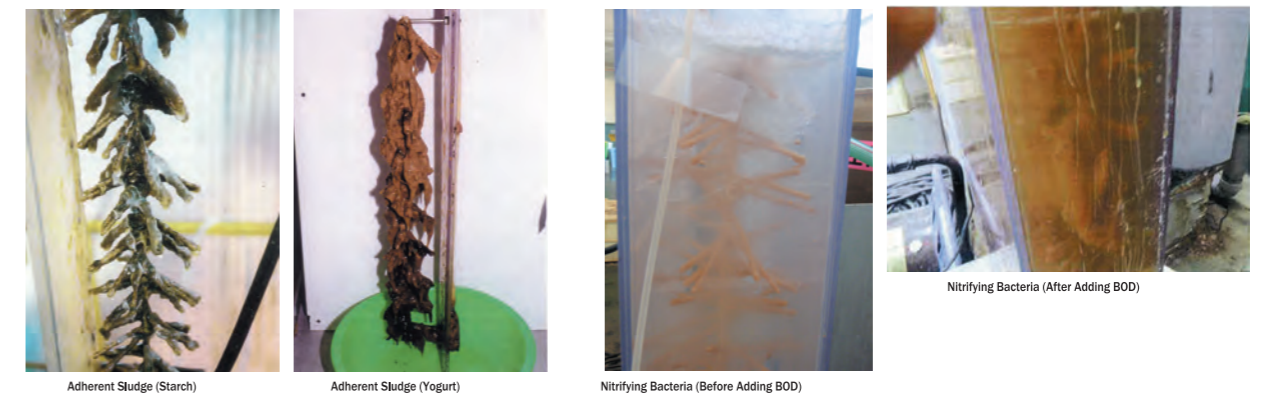


## 5 Low Concentration BOD Short-time Treatment

### • Test Results I (For BOD 30-50)



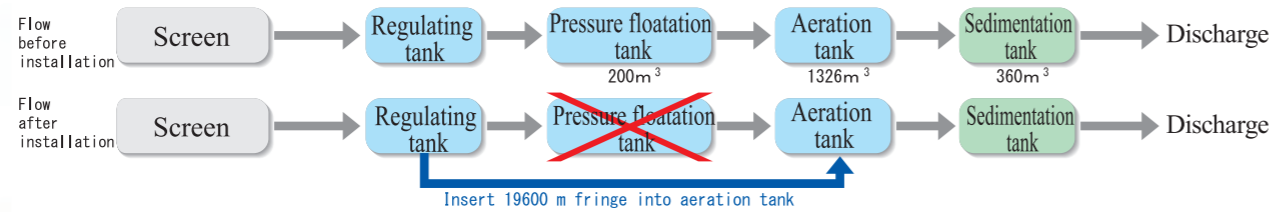
### Adherent Sludge



Incorporation of natural law allows for a differentiation effect, enabling us to attain unheard of performance at various types of factories and test results at research organizations.

## 1 Effects attained through streamlining of existing plants

### Treatment flow before and after BF installation



### Comparison of effluent amount and quality before and after BF installation

	Flow rate m <sup>3</sup> /day	Raw water quality				Treated water quality				
		BOD	COD	SS	n-H	BOD	COD	SS	n-H	MLSS
Before installation (After pressure floatation treatment)	450	1180 (967)	767 (645)	325 (29)	162 (9)	Max. 1	39	31	Max. 2	6030
After installation	538	2100	378	342	269	3	11	9	Max. 1	11200

Units: mg/ℓ

### Comparison of sludge conversion rate before and after BF installation

Before installation (including pressure floatation sludge) **65%** After installation **5.1%**



## 2 Process-Omitted Treatment at Paper Manufacturing Factory

### General paper manufacturing drainage treatment flow

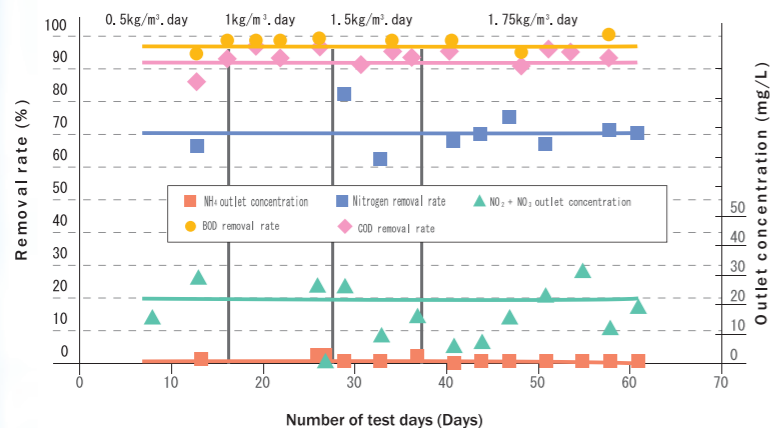


### Drainage treatment flow using BF



(SS removal at the primary treatment is unnecessary (process is shortened); maintenance is easier.)

## 3 Test results from Dalian University of Technology (Sewage water contaminated with fish processing waste water)



## 4 BF-V Relationship of treated water and water quality standards

Item	Raw water	Treated water standard		BF-V Treated water quality	After BioFilter Treated water quality	Evaluation
		Grade 1 A quality (removal rate %)	Grade 4 A quality (removal rate %)			
COD <sub>cr</sub>	450	50 (89)	30 (93)	23 (95)		○
BOD	200	10 (95)	6 (97)	10 (95)	3	○
SS	200	10	10	20	3~7	○
NH <sub>4</sub> <sup>+</sup> -N	40	5	1.5	1 (100)		◎
T-N	50	15	-	15 (70)		○
T-P	8	0.5	0.3	2.4 (70)		△

Added treatment technology/coagulation treatment

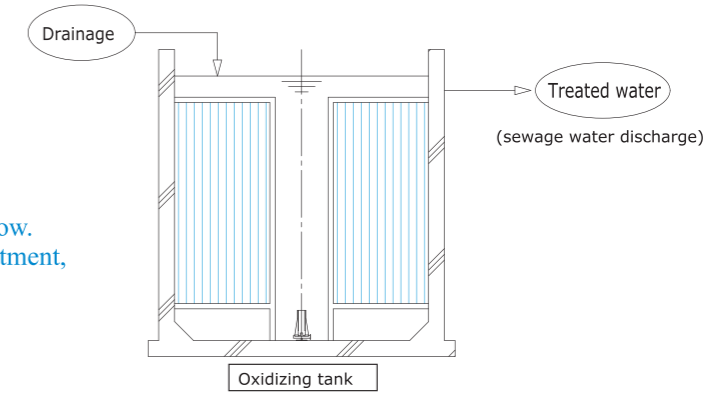
Maximizing the possibilities in biological treatment by setting up a field for a variety of application purposes where microorganisms function.

## 1 BF-I (Transient)

[Feature] Simply add BF to the aeration tank

1. Highly efficient and simple treatment
2. No sludge treatment
3. Maintenance-free

Effective when removal rate is comparatively low. Optimum for low-concentration short-time treatment, such as river purification. Service water pretreatment.

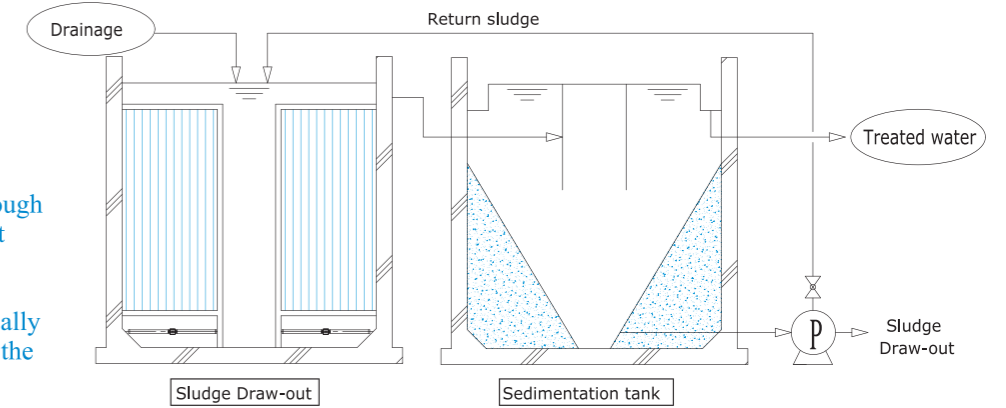


## 2 BF-II (Sludge Return Method)

[Feature] Using BF in entire aeration tank

1. Dramatically enhanced performance
2. Allows pretreatment to be omitted
3. Considerable reduction in the generation of sludge

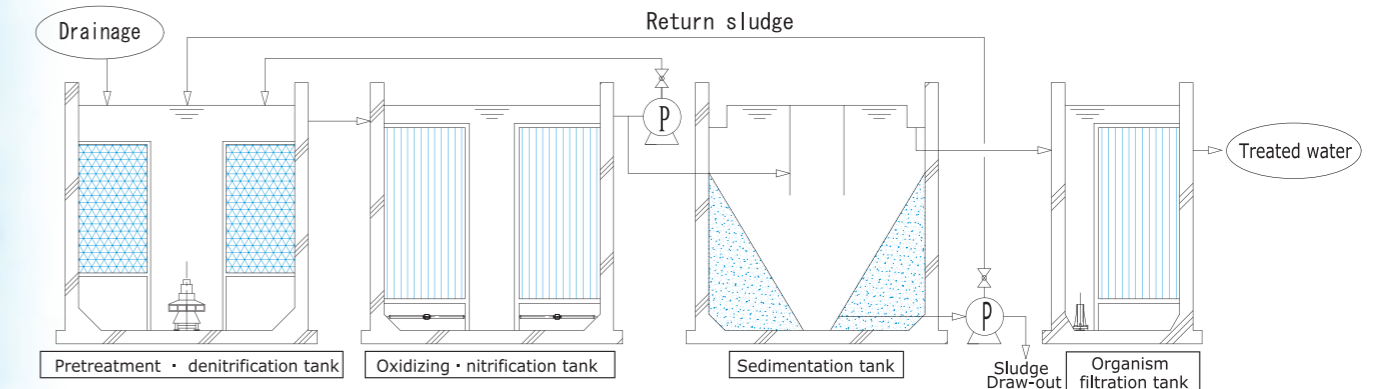
Significant improvement through the synergy effect of adherent sludge and floating sludge shortening the coagulation pretreatment, which dramatically enhances capacity, decreases the volume of sludge, and it is maintenance free.



## 3 BF-V (Circulatory nitrification denitrification dephosphorization method)

[Feature] Using BF's high sludge-retention capacity

1. High nitrification capacity / 2. High denitrification capacity / 3. Increased capacity / 4. Maximum cost performance



Using the high sludge-retention capacity of BF, it is possible to retain massive amounts of nitrifying bacteria that has a slow growth rate. This attains nitrification capacities that cannot be found in other types, maximizes investment effect because it is maintenance free, increases capacity, and minimizes the water tank volume

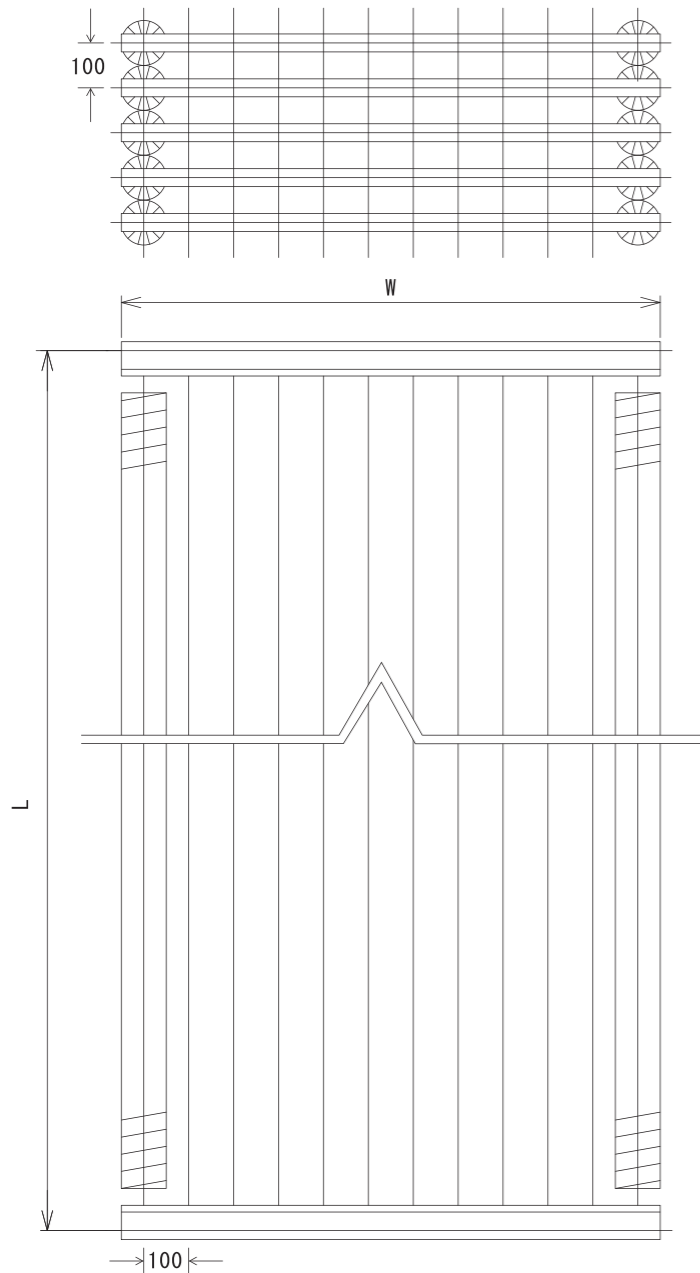


■ BioFringe (BF-N) Unit Specifications Chart

BF-N Specifications Table

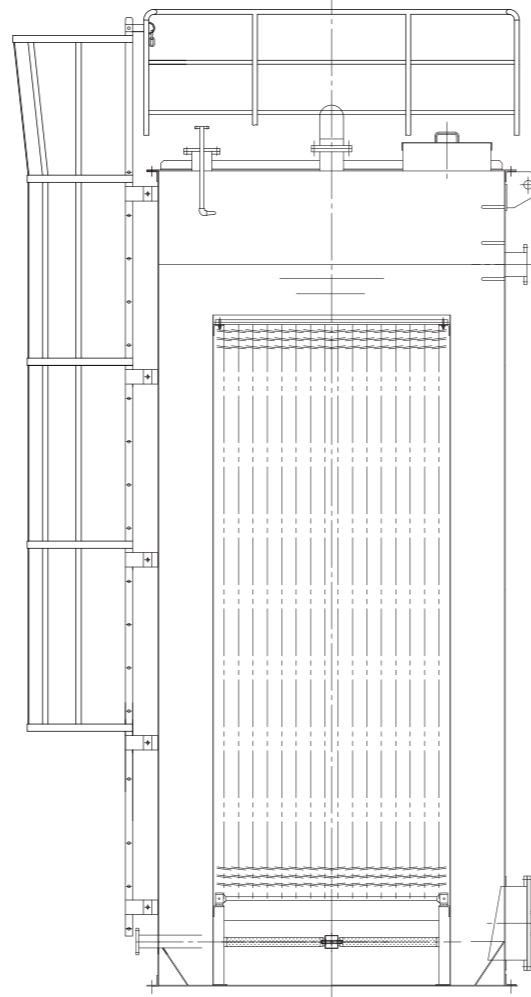
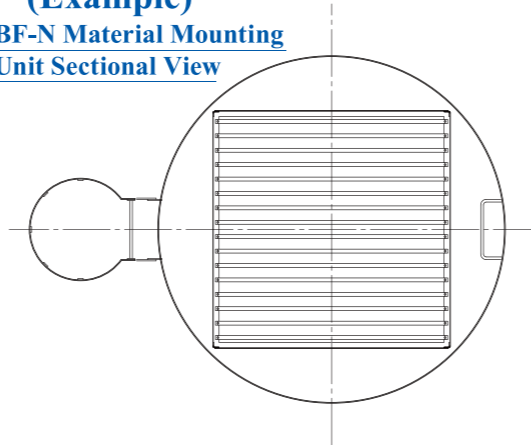
Width (W)	1.2m	0.6m	0.4m	0.3m	0.2m
Quantity	12pcs	6pcs	4pcs	3pcs	2pcs
Total Length (L)					
3.00	○	○	○	○	○
4.00	○	○	○	○	○
5.50	○	○	○	○	○

\* Special lengths can be manufactured.  
 \* Total length (L) indicates center distance of upper and lower attachment pipes.



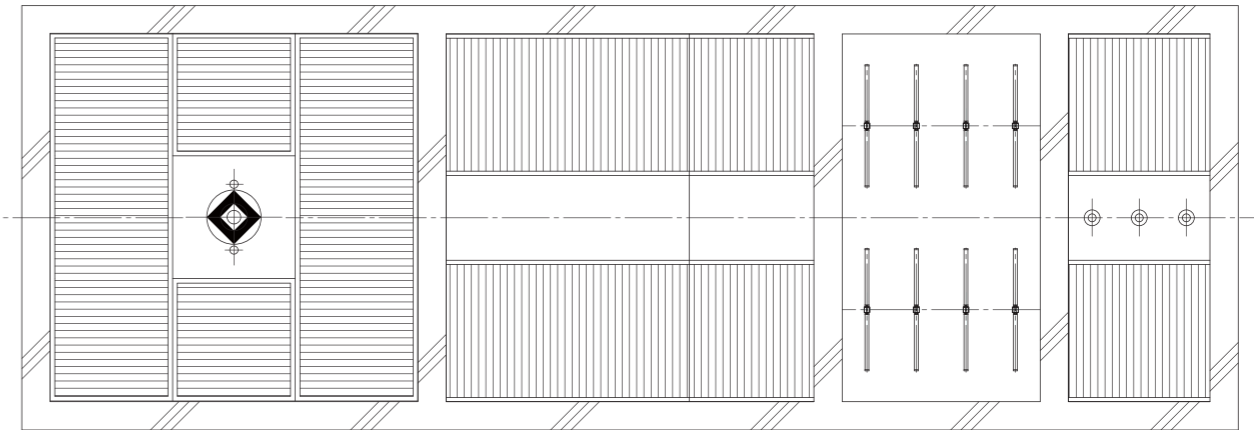
■ BF Unit Standard Diagram (Example)

BF-N Material Mounting Unit Sectional View



Assembly Sectional View

■ BF-V Tank Arrangement (Example)

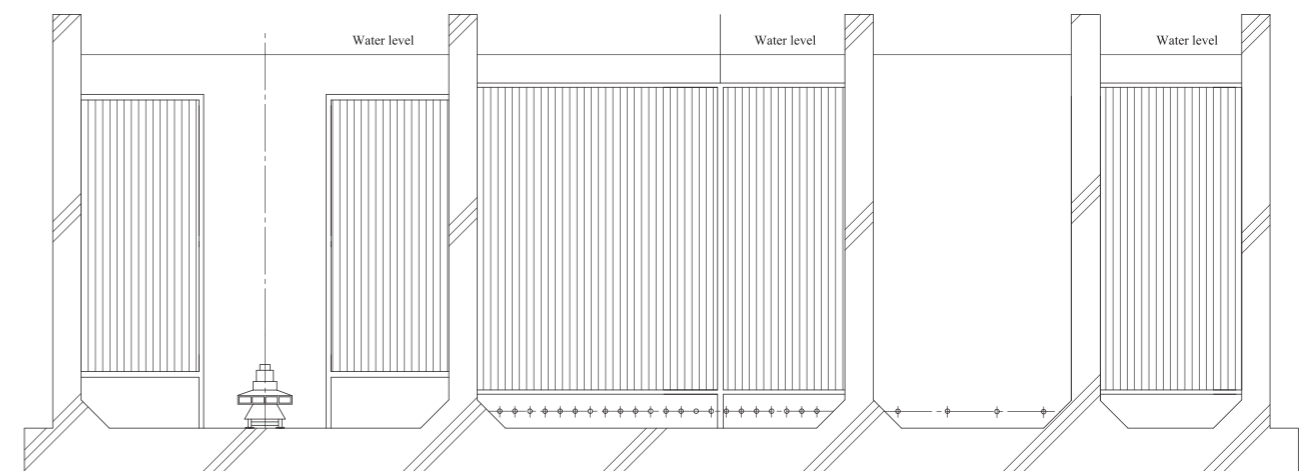


BF-A Tank

BF-O Tank

Spare Tank

Bio-F Tank



MEMO