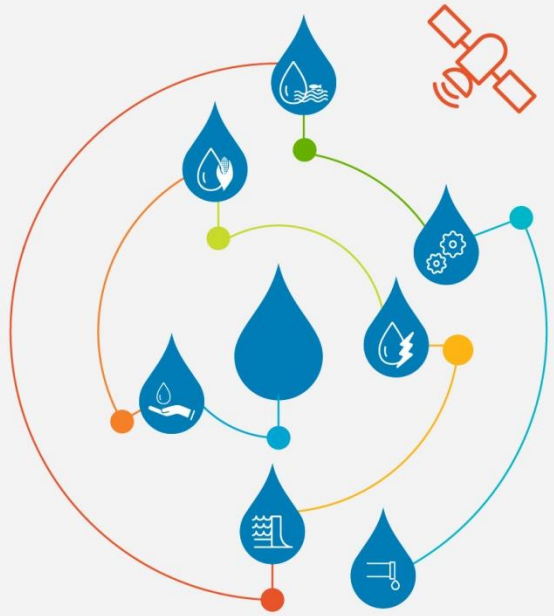
Advanced Energy Saving Wastewater Treatment System for Sound Sanitation Development in Developing Countries



Tatsuhiro UEDA

Director, Japan Sewage Works Agency

Oct 2, 2018

Suitable wastewater treatment system

1) **Most suitable sanitation = combination of on-site and off-site systems**

- Dense area, growing area ⇒ **off-site systems** (sewerage system)
- Low density area, low growing area ⇒ **on-site systems**

(**E.g.:** septic tanks, Package Aerated Wastewater Treatment Plants: *Johkasou* in Japan)

2) **Important criteria for WWTPs (sewerage) :**

- Stable quality of treated wastewater
- Low construction cost
- Small footprint
- Low operation cost (low power consumption)
- Easy operation and maintenance

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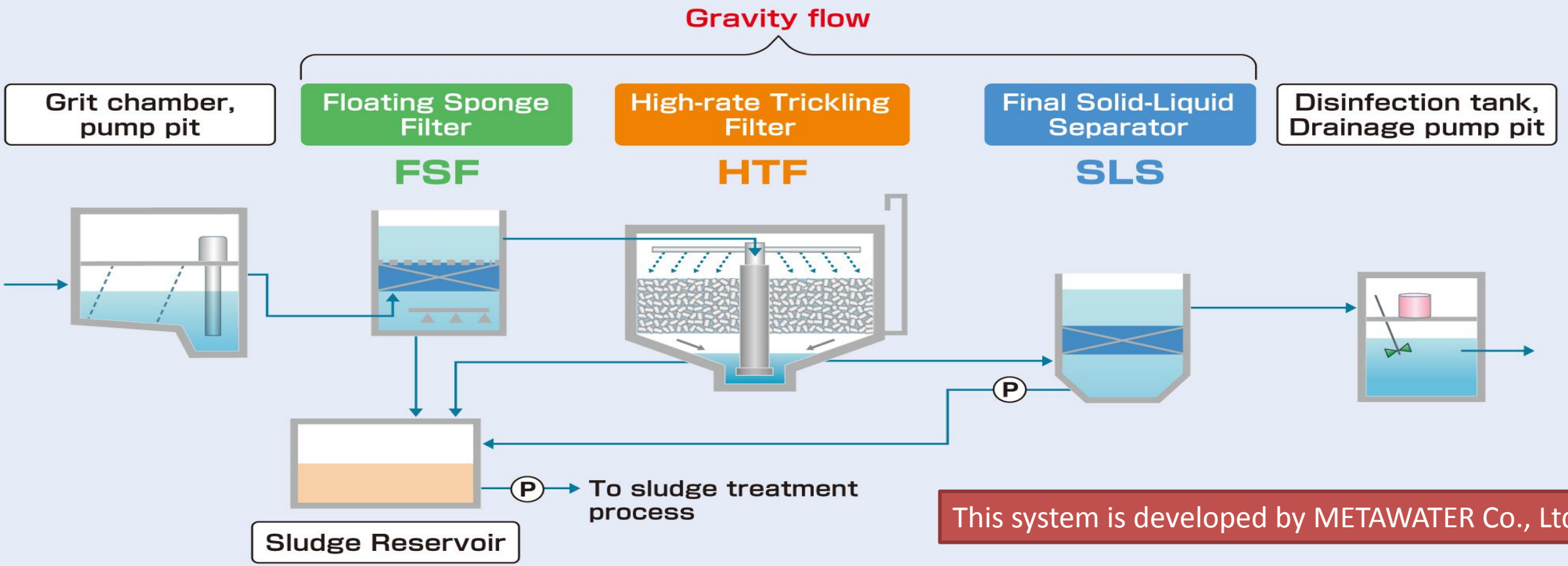
Advanced Energy Saving Wastewater Treatment Process

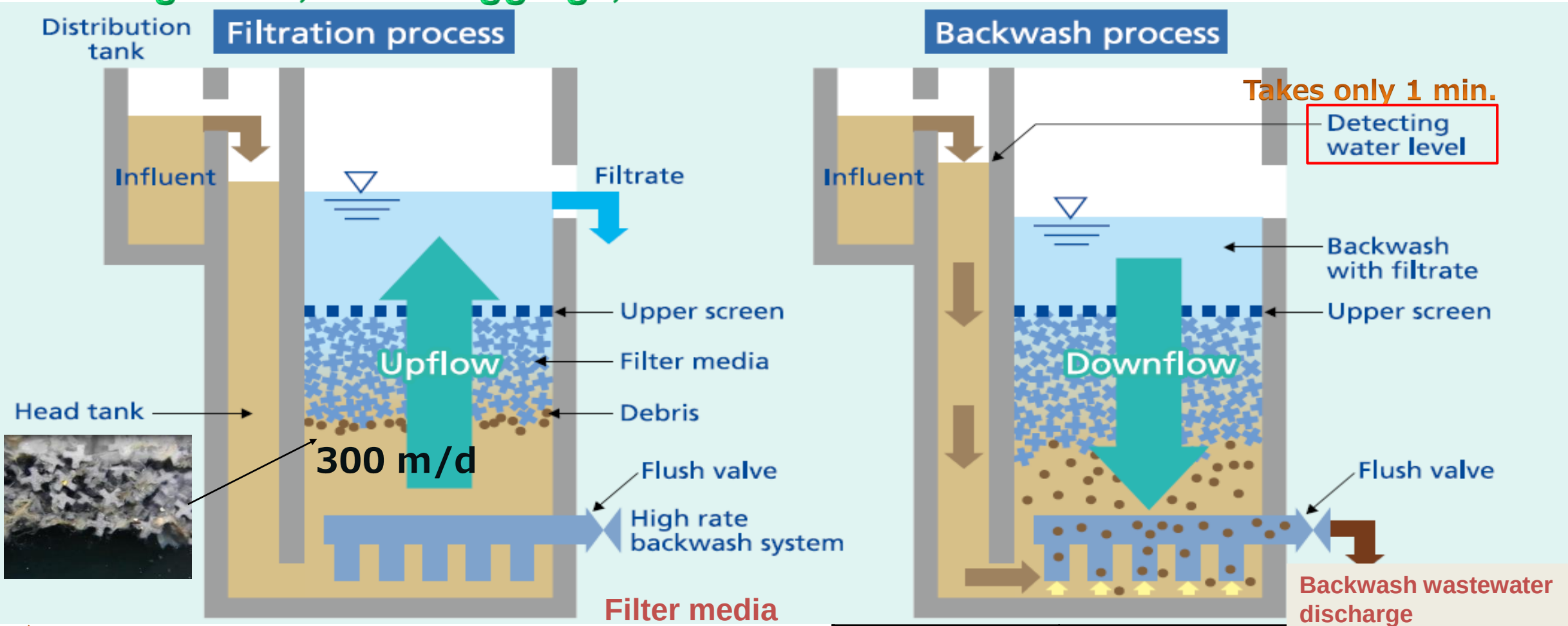
PTF (Pre-treated Trickling Filter)



Floating Sponge Filter(FSF)	Removal of debris, SS and particulate BOD
High-rate Trickling Filter(HTF)	Removal of soluble BOD
Final Solid-Liquid Separator(SLS)	Removal of fine SS (detached biofilm, etc.)

Floating Sponge Filter “FSF”

“No coagulant”, “No clogging”, “Instant backwash”



- High removal performance
- Continuous operation
- No screen cleaning
- Numerous installations in Japan

Filter media

Shape	Pinwheel shape
Scale	7.5 × 7.5 ×4 mm
Material	Polymer
Specific gravity	Lower than 1

High-rate Trickling Filter “HTF”

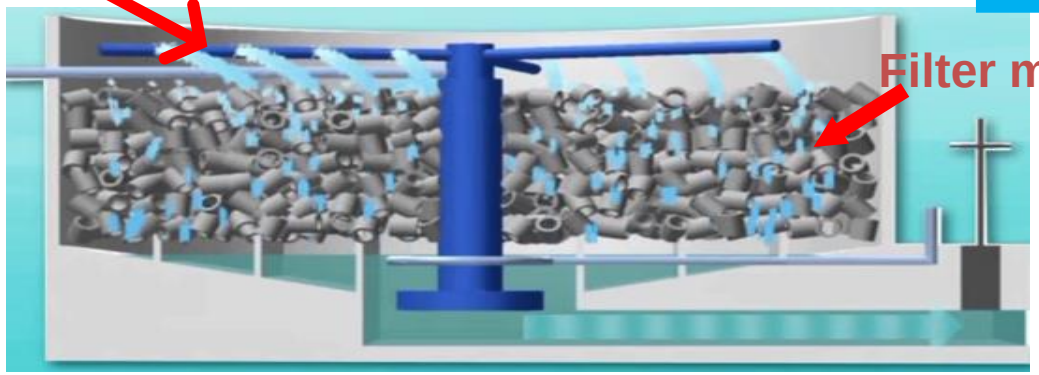
“High Hydraulic Load”, “Floatable & Washable Media”

Trickling process

Sprinkler

1.6kg-BOD/m³ d

Filter media

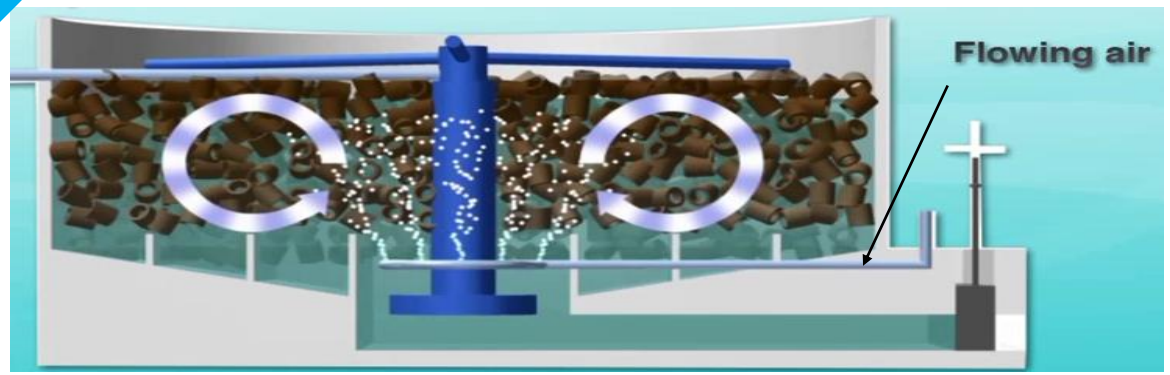


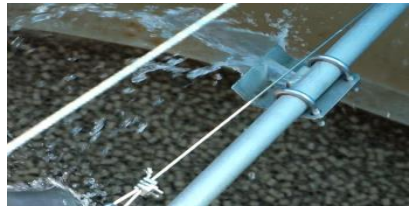
Monthly 2～3 time

Washing process

“Soaking”

Remove excess sludge and insects



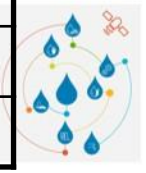


Rotate several times per minute by gravity

- Higher hydraulic load than rock media
- No electric power to supply oxygen
- Mitigates odor and flies problems

Filter media

Shape	Cylindrical shape
Scale	15 × φ15 mm
Material	Polymer
Specific gravity	Lower than 1



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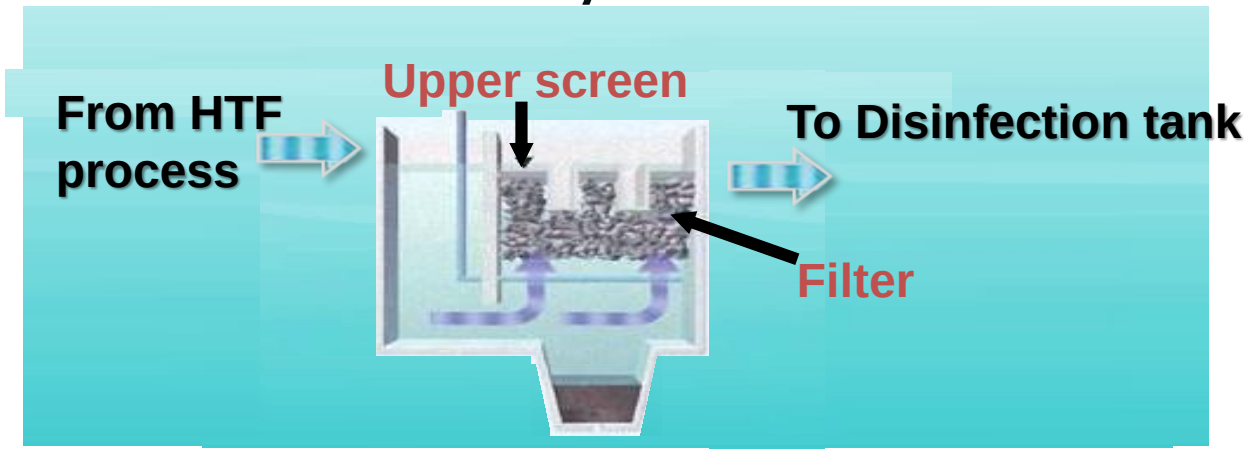
Solid-Liquid Separator “SLS”

“Simple and Compact” Sedimentation Tank

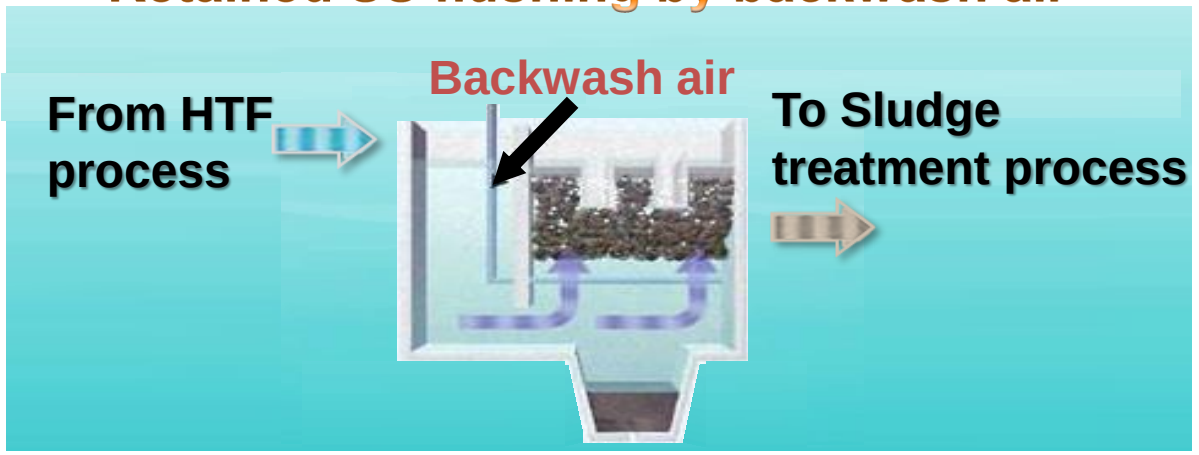
Separation process

150 m^3/m^2 d

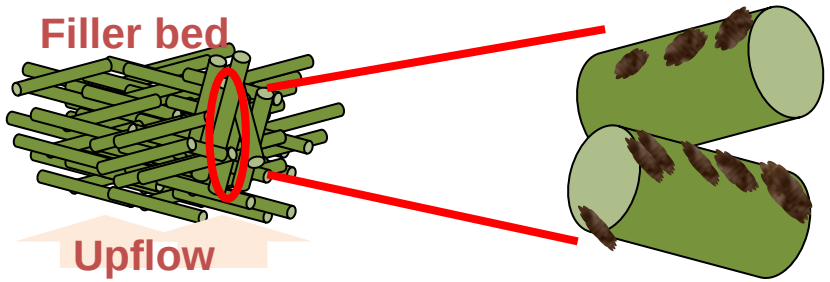


Backwash process

Retained SS flushing by backwash air



Filler bed works like a “micro” plate settler.



Filter media

- Simple configuration
- High removal ratio
- Suitable for HTF effluent

Shape	Cylindrical shape (Smooth surface)
Scale	7 × φ7 mm
Material	Polymer
Specific gravity	Lower than 1

Pilot Plant

Location : Phu Loc Wastewater Treatment Plant, Da Nang City, VIETNAM

Floating Sponge Filter (FSF)

High-rate Trickling Filter (HTF)

Raw wastewater sampling point
(Lagoon inflow waterway)

Final Solid Liquid Separator (SLS)

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Performance of Pilot Plant (Da Nang City, VIETNAM)

Nov 2012 – Jan 2014
Inflow SS: 34 – 200 (Avg. 102) mg/L BOD: 16 – 140 (Avg. 66) mg/L

	Target Value		Experimental Result
Water Quality	SS (mg/L)	< 30	Max 23 Avg. 11
	BOD (mg/L)	< 30	Max 19 Avg. 8
Electric Power Consumption (kWh/m^3)	< 0.1		0.045
Footprint (m^2) (in case of 20,000m^3/d)	< 4,000		3,000

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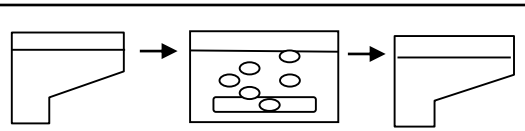
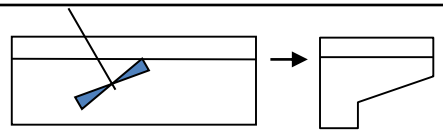
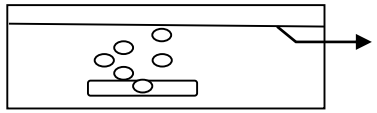
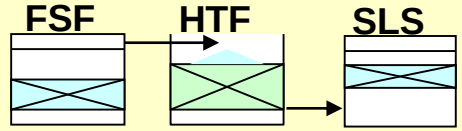
Technical Comparison

(20,000 m^3/d in scale)

	Conventional Activate Sludge Process	Oxidation Ditch Process	Sequencing Batch Process	PTF Process
System Flow				
Power Consumption	0.4 kWh/m^3	0.8 kWh/m^3	0.9 kWh/m^3	0.1 kWh/m^3
Footprint	4,000 m^2	14,400 m^2	3,600 m^2	2,050 m^2
Technical Level for O&M	High	Low	High	Low
Facility Cost	High	Low	Low	Low

Technology Verification

The Japan Sewage Works Agency (JS), a qualified third-party institute in Japan, has verified and certified the performance of the technology

Certificate of
Technology Verification

Technology: *Advanced Energy Saving Wastewater Treatment Process*

Applicant: *Metawater Co., Ltd.*

Japan Sewage Works Agency verifies the performance of *Advanced Energy Saving Wastewater Treatment Process* *Metawater Co., Ltd.* developed and experimented in Da Nang City, Socialist Republic of Vietnam from November 2012 to January 2014.

Date of Certification: March 20, 2014

Yoshihiko Yato

Yoshihiko Yato
President, Japan Sewage Works Agency

Japan Sewage Works Agency (JS)

- was established in 1972, as a government agency by the central & local governments
- gathers qualified engineers in various fields
- has many technical guidelines & manuals
- supported about 70% of local governments in the implementation of sewerage projects
- is expected to support worldwide global wastewater projects

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Toward the 2030 Agenda for Sustainable Development

Energy saving & easy operation : BENEFITS

Help the realization of the 2030 Agenda for Susainable Development

- achieve access to adequate and equitable sanitation and hygiene for all
- halve the proportion of untreated wastewater
- protect and restore water-related ecosystems
- support and strengthen the participation of local communities in improving water and sanitation management

Full scale PTF plant will be completed soon!

Site	**Hoi An City, VIETNAM**
Dairy average flow	**2,000m^3/d**
Construction period	**Mar 2017 – Oct 2018**

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