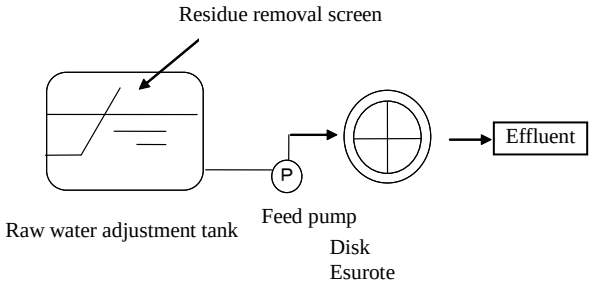
○ Overview

Target verification technology/Environmental technology developer	Biofilm (rotating contactor) method / Sekisui Aqua Systems Co., Ltd.
Verification organization (executing the test)	Kagawa Prefectural Government (Kagawa Prefectural Research Instiute for Environmental Science and Public Health, Shikoku Instrumentation CO., LTD.)
Verification test period	September 30, 2004 through February 22, 2005
Objective of this technology	Treatment of organic wastewater by a compact facility

1. Summary of target verification technology

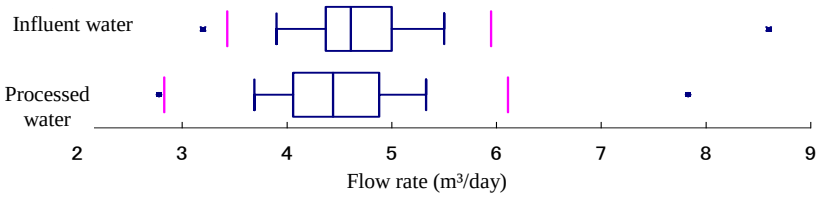


Principle

With approx. 40% of the disk on which biofilm is formed soaked in the wastewater, the disk is rotated at a low speed to allow the biofilm to be exposed to the air and wastewater alternately, so that the organic substances in the wastewater are subject to aerobic degradation for treatment. The system simply consists of a raw water adjustment tank and a disk.

2. Summary of the verification test

○ Summary of the verification-test site

Type of business establishment	Production of boxed meals and noodle and similar
Scale of business establishment	64,000 portions/day
Location of site	517 Kotohira-cho, Nakatado-gun, Kagawa Prefecture
Amount of wastewater during the verification-test period	

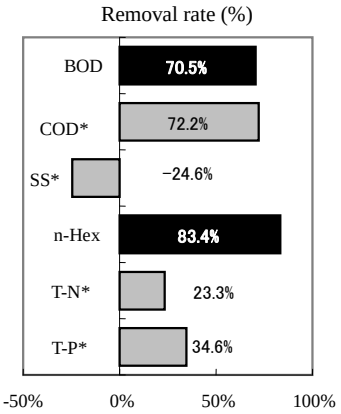
○ Specifications and processing capacity of the target verification apparatus

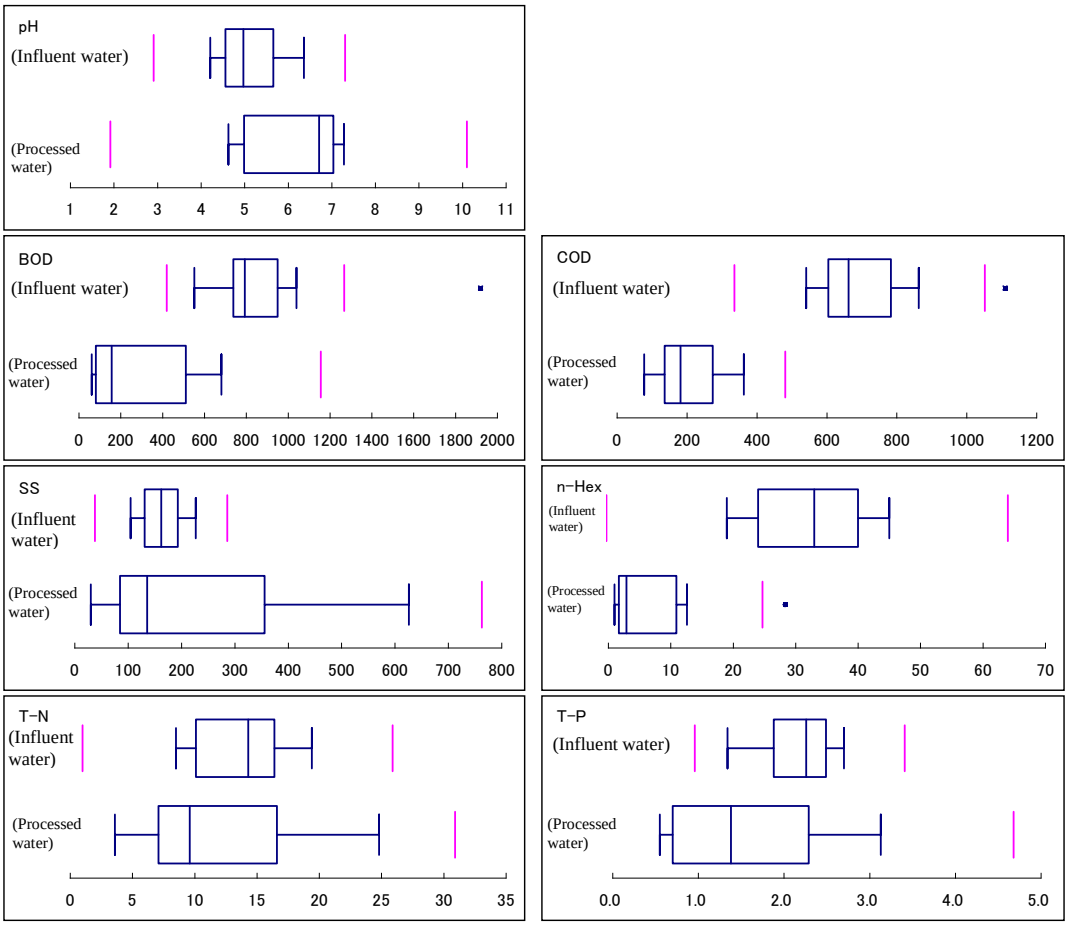
Division	Item	Specifications and processing capacity
Outline of apparatus	Model	Esurote 0.5 type
	Dimensions and weight	W1,500mm × D1,900mm × H1,480mm, 1,050kg
Design conditions	Target substances	BOD, n-Hex
	Daily wastewater flow rate	5 m^3/day
	Influent-wastewater quality	(BOD)400mg/L, (SS)100mg/L, (pH)6 - 8, (n-Hex)30mg/L
	Processed wastewater quality	(BOD)120mg/L, (SS)150mg/L, (pH)6 - 8, (n-Hex)20mg/L

* This target verification apparatus is designed to satisfy all the items of the uniform standards under the Water Pollution Control Law. As a result of emphasizing the treatment of n-Hex and BOD, the processed wastewater quality in connection with SS is assumed to have deteriorated compared to the respective levels detected in the influent wastewater. These apparently reversed results when the influent and effluent quality were compared are assumed to be attributable to n-Hex and BOD treatment; this apparatus is not designed to deteriorate SS values if used when n-Hex and BOD are not present.

○ Verification items concerning water quality

Item	Unit	Verification results (Lower adjacent value through upper adjacent value, and median)			
		Influent water		Processed water	
pH*	-	4.2 - 6.4	5.0	4.6 - 7.3	6.7
BOD	mg/L	550 - 1,000	790	61 - 680	160
COD*	mg/L	540 - 860	660	78 - 360	180
SS*	mg/L	110 - 230	160	30 - 630	140
n-Hex	mg/L	19 - 45	33	1.0 - 13	2.9
T-N*	mg/L	8.5 - 19	14	3.6 - 21	9.6
T-P*	mg/L	1.3 - 2.7	2.3	0.55 - 3.1	1.4





Note 1: The removal rates are calculated from the results of periodical tests. Removal rate = (Total pollution load of influent water – Total pollution load of processed water)/ Total pollution load of influent water

Note 2: Items marked with * are excluded from the target items which this particular target verification apparatus is assumed to remove.

Note 3: Number of influent water data = 25 Number of processed water data=25

Reference) The medians of the influent water in the verification test, compared to the design conditions of influent water quality concentrations which are BOD at 400 mg/L and SS at 100 mg/L, are almost doubled: BOD at 790 mg/L and SS at 160 mg/L. Likewise, the median of the influent water in the verification test, compared to the design condition of pH of the influent water which is pH6 to 8, is much lower at pH5.

○ Items concerning environmental impact

Item	Verification results
Amount of generated sludge	No sludge generation was detected during the verification test period.
Amount of generated waste	Not generated in the target verification apparatus.
Noise	67.5 dB (including noise generated by sources other than the facility itself)
Odor	Odor index: 12 Odor concentration: 17 Odor intensity: 1 (six grade odor intensity measurement method) Odor offensiveness: -1 (nine grade odor offensiveness measurement method)

○ Items concerning used resources

Item	Verification results
Electricity consumption	12.2kWh/day
Consumption of other materials	Grease: 1 ml/day Lubricant: 5 ml/day

○ Items concerning operation and maintenance performance

Maintenance item	Maintenance time and frequency	Number of operators and level of operator expertise required for maintenance
Daily inspection	15 min (once a day)	One operator. No particular expertise is required.。
Periodical inspection	15 min (once a month)	One operator. No particular expertise is required.。

○ Qualitative findings

Item	Findings
Water quality findings	Influent water：Milky white with some turbidity Processed water: Light milky white with a little turbidity (Measured on Feb. 1, 2005)  Influent water　Processed water
Period required for startup of the target verification apparatus	2 weeks (including installation and trial run)
Period required for stoppage of the target verification apparatus	1day
Reliability of the target verification apparatus	No operational trouble such as unexpected operation stoppage or similar occurred during the verification test period. Since the adjustment conditions are fixed, maintenance of the apparatus for the purpose of securing the quality of the processed water was slightly difficult. When selecting the model type, the characteristics of the influent water must be strictly evaluated.
Restoring from a trouble state	Operational failures may be restored in accordance with the Operating Manual. However, other types of trouble must be solved by the verification technology developer or a special servicing establishment.
Evaluation of O&M instruction manual	Nothing in particular needs to be improved.
Others	○ The purification capacity and environmental conservation effect have been verified in the wastewater whose concentration was twice that of the design water quality. ○ Treatment of excess sludge was not necessary.

(Information for reference)

The information provided on this page has been submitted by the environmental technology developer, who is solely responsible for its contents. Neither the Ministry of the Environment nor the Verification Organization may be held responsible for the information.

○ Product Data

Item		Information provided by environment technology developer
Name/Model No.		Sekisui cubic lattice contactor Esurote unit system/Esurote 0.5 type
Name of manufacturer (distributor)		Sekisui Aqua Systems Co., Ltd.
Contact address	TEL/FAX	TEL(06)6440−2507 / FAX(06)6440−2606
	E-mail	−
Dimensions/Weight		W 1,500mm×D 1,900mm×H 1,480mm 1,050kg
Necessity for pre- and/or post-treatment		Required depending on the quality of the raw water.
Additional equipment		Not required
Lifespan of target verification apparatus		15 years
Startup period		About 2 weeks

Approximate cost(yen)	Item	Unit price	Qty.	Total
	Initial cost*			4,900,000
	Equipment cost (Esurote 0.5 type)		One set	3,800,000
	Equipment cost (measurement tank, treatment tank, pump, etc.)		One set	650,000
	Equipment installation work		One set	450,000
	Running cost (monthly)			7,250
	Sludge treatment cost	-----	-----	-----
	Waste treatment cost	-----	-----	-----
	Electricity consumption	15	450kWh	6,750
	Water consumption	-----	-----	-----
	Water treatment chemical cost	-----	-----	-----
	Other consumables		One set	500
	Maintenance commissioning cost	-----	-----	-----
	Per 1 m³ of processed wastewater (Processed wastewater is assumed to be 150 m³/month.)			48

* The initial cost varies with the design conditions.

○ Micellaneous information provided by the manufacturer

- The apparatus is compact in size, economical in electricity consumption, and easy to operate and maintain.
- The apparatus can also serve as a pre-treatment facility for sewage treatment equipment or the existing activated sludge treatment facility.
- With the apparatus combined with an effluent water monitoring tank (for a retention period of 15 to 30 min), the quality of the processed water may be stabilized.
- Esurote models come in three types by capacity: 0.5 type, I type, and II type.