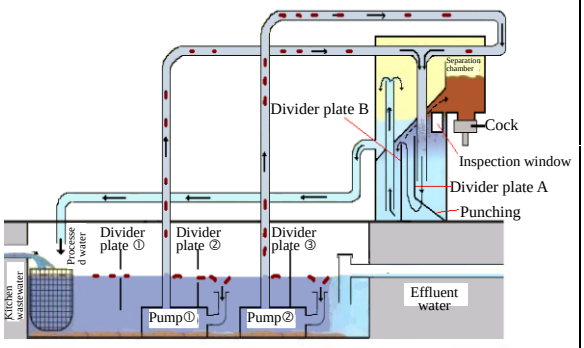
○ Overview

Target verification technology/ Environmental technology developer	Automatic floating oil collection machine “Grease Vacuumer System”/Maruhachi Co., Ltd.
Verification organization (executing the test)	Hiroshima Prefectural Government (Hiroshima Prefectural Health Environmental Center, Hiroshima Environment & Health Association)
Verification test period	October 16, 2004 through February 13, 2005
Objective of this technology	(1) The grease trap is automatically cleaned to maximize performance. (2) Odor generated in the grease trap is prevented.

1. Summary of target verification technology



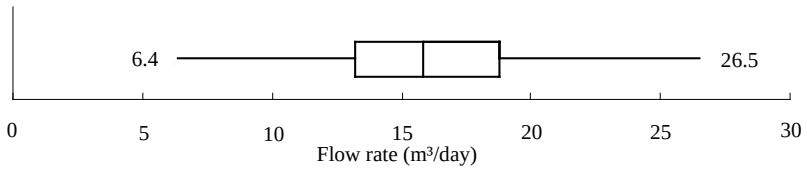
Grease trap

[Principle]
Using the existing grease trap, floating oil is automatically collected into the main body of the apparatus and then stored in the separation chamber. The oil content thus separated is discharged via the cock for disposal with ease.

【Features】
- High-concentration oil content in the wastewater is removed.
- Floating oil is disposed of quickly.
- Odor is prevented.

2. Summary of the verification test

○ Summary of the verification-test site

Type of business establishment	Restaurant (Chinese noodle in pork-bone soup)
Scale of business establishment	Total floor area: 221 m^2 Number of seats: 68 Average portions served during verification test period: 298
Location of site	300 Yamakita, Setomachi, Fukuyama City, Hiroshima Prefecture (Hakata Ramen Ajinokura Safa Fukuyama branch)
Capacity of the existing grease trap	Total capacity: 800 × 1480 × 1130mm = 1300L Effective capacity: 800 × 1480 × 450mm = 500L
Amount of wastewater during the verification-test period	

○ Specifications and processing capacity of the target verification apparatus

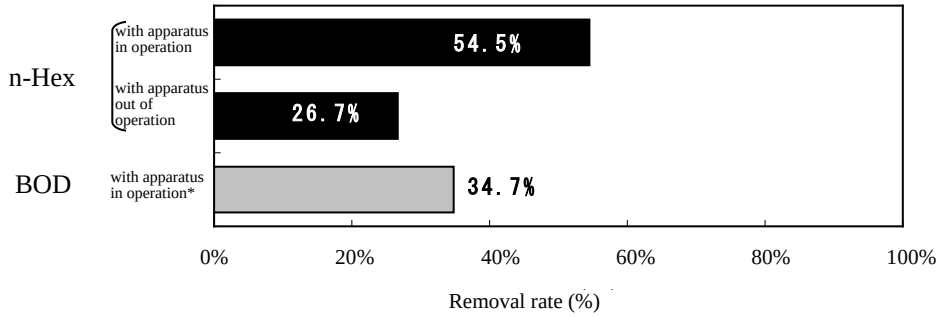
Division	Item	Specifications and processing capacity
Outline of apparatus	Model	GB-20 (2-pump configuration) Small type
	Dimensions and weight	W630mm × D380mm × H1,030mm, 52kg
Design conditions	Target substances	n-Hex (floating oil in the grease trap)
	Amount of processed substances	Collected floating oil 25kg* * Max. storage amount per single removal operation.

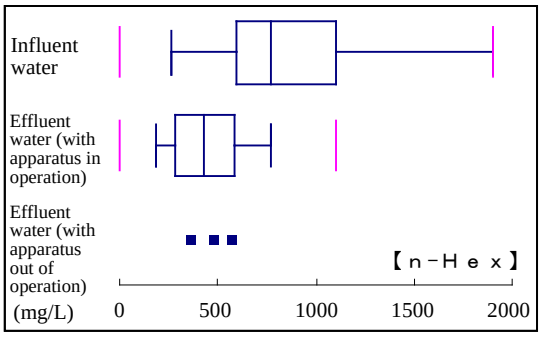
3. Results of the verification test

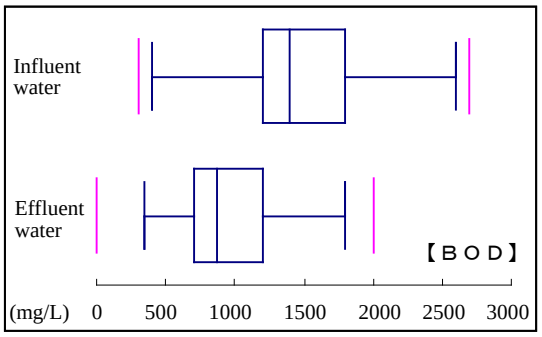
○ Verification items concerning water quality

Item	Unit	Verification results(daily average values) (Lower adjacent value through upper adjacent value, and median)	Verification results(daily average values) (Lower adjacent value through upper adjacent value, and median)	
		Influent water	Effluent water (with apparatus in operation *1)	Effluent water (with apparatus out of operation *2)
n-Hex	mg/L	260 – 1900, 770	190 – 770, 430	360, 480, 570

Item	Unit	Verification results (daily average values) (Lower adjacent value through upper adjacent value, and median)	
		Influent water	Effluent water (in operation)
BOD *3	mg/L	400 – 2600, 1400	350 – 1800, 870







Note 1: The removal rate is determined by the equation shown below.
(Total of the measurements of pollution loading amount of influent water per day – Total of the measurements of pollution loading amount of processed water per day) /(Total of the measurements of pollution loading amount of influent water per day

Note 2: Sampling was conducted for the measurement of *1 above, when the target verification apparatus had been in operation continuously for a week and the grease trap had been automatically cleaned every day.

Note 3: Sampling was made for the measurement of *2 above, when the target verification apparatus had been stopped for a week and the grease trap had not been cleaned for that period (the oil had been stored continuously for a week).

Note 4: Items marked with *3 are excluded from the target items which this particular target verification apparatus is assumed to remove.

Note 5: n-Hex Number of influent water data=17
Number of effluent water data (pieces of apparatus in operation)=14
Number of effluent water data (pieces of apparatus out of operation)=3
BOD Number of influent water data=12
Number of effluent water data=12

Note 6: All the measurements of the effluent water (with apparatus out of operation) are plotted as they are fewer in number compared to the influent water data

○ Items concerning environmental impact

Item	Verification results
Amount of generated waste	Waste oil: 18.4 kg/day
Noise	59 dB (The target verification apparatus itself did not generate any noticeable noise.) (Reference) The background noise while the target verification apparatus is out of operation was 58 dB.
Odor	Findings during the verification test period: “No odor to minimal odor” (Reference) Findings during the removal of collected oil (6 min/day): Minimal odor Measurement result (October 31, 2004): Odor index at 14

○ Items concerning used resources

Item	Verification results
Electricity consumption	0.3 kWh/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	6 min (every day)	No particular knowledge or expertise is required. One operator can handle the inspection.
Periodical inspection	Equipment inspection and cleaning: 15 min (once a month) Grease trap cleaning: 50 min (once a month)	

○ Qualitative findings

Item	Findings
Water quality findings	Influent water: Transparency at 2 to 3, light brown to deep gray, and medium level of kitchen refuse odor Effluent water: Transparency at 2 to 3, light to deep gray, and minimum level of kitchen refuse odor  October 24, 2004 (out of operation for one week)  January 22, 2005 (after 61 days of operation)
Period required for startup of the target verification apparatus	Not verified, because the facilities had been operated.
Period required for stoppage of the target verification apparatus	
Reliability of the target verification apparatus	The facility operated almost normally with stability during the verification test period.
Restoring from a trouble state	Failures may be restored in accordance with the Operating Manual or Maintenance Manual. However, fixing mechanical failure in the apparatus or adjusting the operating conditions requires expertise.
Evaluation of O&M instruction manual	Procedures required for daily inspection and operation are concretely described, with descriptions provided for easy judgment and comprehension. Important information, such as operating procedures and FAQ, are briefly summarized on a two-page spread: it is easy to find and understand the necessary information.
Others	Compared with floating oil collection work by means of a ladle, the time required is shorter and the work is labor-saving. The odor suppression effect and performance with respect to splashed oil or wastewater around the grease trap are verified. Electricity consumption is low as the apparatus does not use consumables or chemicals. Floating oil was collected without any deterioration in the water quality.

(Reference information)
The information shown on this page is provided by the applicant for verification at its responsibility for publication of the technical data and not the subject of the verification experiment. The Ministry of the Environment and the organization conducting the verification experiment are not responsible for the information on this page.

○Product date

Item		Column to be filled in by the environmental technology developer			
Name / type		Automatic floating oil collection machine “Grease Vacuumer System”			
Manufacturer (distributor)		Maruhachi Co., Ltd.			
Contact address	TEL / FAX	TEL(084)933－2431 / FAX(084)934－0363			
	E-mail	info@maru-hachi.co.jp			
Size and weight		W 630mm×D 380mm×H 1,030mm 52kg			
Necessity for pre-treatment and post-treatment		It is necessary to install a grease trap of the proper capacity based on the kitchen wastewater volume and to perform correct maintenance and control according to the instructions by the manufacturer.			
Supplementary facility		Air blower (to be used when the fats are solidified in the grease trap in winter)			
Life of the equipment		7 years			
Time for initiation		1 hour (not affecting the business operation in the facilities)			
Approximate cost (yen)		Expense item		Unit price	Quantity	Total
		Initial cost				1,300,000 yen
			GB-20 (two pumps) Shipping cost is included.	1,200,000yen	One set	1,200,000 yen
			Cost for installation adjustments	80,000 yen	One set	80,000 yen
			Water spray bars and mounting cost (including auxiliary equipment)	20,000 yen	One set	20,000 yen
		Running cost (monthly)				10,198 yen~
			Sludge treatment cost	-----	-----	-----
			Waste treatment cost※	0~35 yen /kg	550 kg	0~19,250 yen
			Electric power consumption	23 yen /kWh	8.6kWh	198 yen
			Water supply consumption	-----	-----	-----
			Cost for wastewater treatment chemical and other expendables	-----	-----	-----
			Cost for commissioned maintenance (periodic inspection)	10,000 yen~	One set	10,000 yen~
			Per 1 m^3 of treated wastewater (assuming that 495 m^3 of wastewater is treated a month)			21 yen~

*In the facility where the verification test was conducted, the waste oil was recycled and so no waste disposal cost was required. The cost indicated here is for reference, assuming that the industrial waste is disposed of in the Bingo Region.

○Other information from the manufacturer (reference information)

- The equipment cleans the grease trap automatically every day, optimizing the ability of the grease trap for treating wastewater and reducing unpleasant smells.
- The equipment can be installed easily in the existing grease trap (water depth is 17 cm or more) and is easy to operate and trouble-free because its structure is simple.
- The waste oil can be removed easily from the cock at the bottom of the separation chamber. In addition, if a maintenance contract is made with us, we will collect the residue accumulated in the grease trap when performing cleaning maintenance once a month.
- If the waste oil is solidified in the separation chamber of the equipment, the waste oil can be collected easily by mounting the optional mixer and oil drain basket.
- The pump is inverter-controlled and the flow rate can be adjusted. The fluctuation of water level in the grease trap can be dealt with by three types of float.
- Three types (large, medium and small) of equipment are available according to the size of the grease trap and the quantity of fats contained in the wastewater.