## ○Overview

| | |
|---|---|
| Technology intended for verification /verification applicants | Scumsavenet & Oilcatch System NH-KB Series / Sannyu Co., LTD. |
| Demonstration institution | Saitama-ken Environmental Analysis & Research Association |
| Period of the experiment for verification | November 13, 2013 |
| Purepose of this technology | By using this technology, the food and soup residues contained in the wastewater discharged during cooking and washing are caught by the scumsave net in the grease trap and the oil is collected by the oil absorbent to improve the performance of the grease trap |

## 1. Outline of the technology intended for verification

Flow diagram, Principle



This equipment is installed at the inlet within the grease trap as shown in the left figure. The scumsave net catches the food residues to prevent them from flowing out of the system. The food residues themselves that are caught and accumulate in the scumsave net also filter the wastewater and catch smaller food resides. At the same time, the wastewater flows from the top of the scumsave net into the grease trap to separate the oil. The food residues caught by the net are dewatered and disposed of when the grease trap is cleaned. The oil absorbents, which are made from waste cardboard, are fed during cleaning to absorb the oil floating in the grease trap, and then they are scooped up with a net and disposed of as shown above.

## 2. Outline of the verification experiment

### 2.1 Outline of the location for performing the verification experiment

| | |
|---|---|
| Project type | Chinese restaurant (Restaurant in a shopping mall) |
| Project scale | Number of seats: 29, Operating hours 7:00 ~ 21:00 (kitchen work 6:00 ~ 22:00), Regular holidays: none |
| Address | 6005-1 Syobu, Syobu-machi, Kuki, Saitama |
| Influent quantity into the equipment intended for verification [2] (Box plot [3]) |  (2): For influent quantity, see Section 6.1 "Results of Monitoring Items" of the detailed version (Page 16 of main part). (3): For the box plot, see "How to Read the Box Plot" (for Reference) (Page 17 of the main section in the detailed part). |

**2.2 Specification and performance of the equipment used for verification**

| Category | Item | Specifications and water treatment capacity |
|---|---|---|
| Outline of the facility | Model | Scumsavenet & Oilcatch System　NH-KB Series |
| | Size and weight | W320 ~ 840mm × D215 ~ 300mm ×H110 ~ 450mm　　1.1kg ~ 2.5kg |
| Design conditions | Object | n-hexane extract content (n-Hex)<br>Suspended solids（SS） |
| | performance | This depends on the quantity of food residues and oil contained in the wastewater, not on the wastewater volume. |
| | Treatment object | 90% or more of n-Hex is removed when the raw-water concentration is 250 mg/L or more.<br>85% or more of SS is removed when the raw-water concentration is 380 mg/L or more. |

## 3. Results of the verification experiment

### 3.1 Use of existing data

It was already confirmed that this equipment removes 98.91% of food residues based on performance tests conducted according to the HASS-217 requirements specified by the Society of Heating, Air-Conditioning and Sanitary Engineers of Japan, a public-interest incorporated association. In addition, the equipment was installed in the grease traps in various facilities to check its effect on water quality, and we confirmed that the oil concentration was reduced by about 90%. Accordingly, the existing data can be used to shorten the period of the verification test. However, to compare the treated water before and after installing the equipment, the difference in time and quality when the wastewater is discharged must be considered. Therefore, it is necessary to sample the influent to the grease trap and the treated wastewater at the same time and to conduct a verification test through daily investigation.
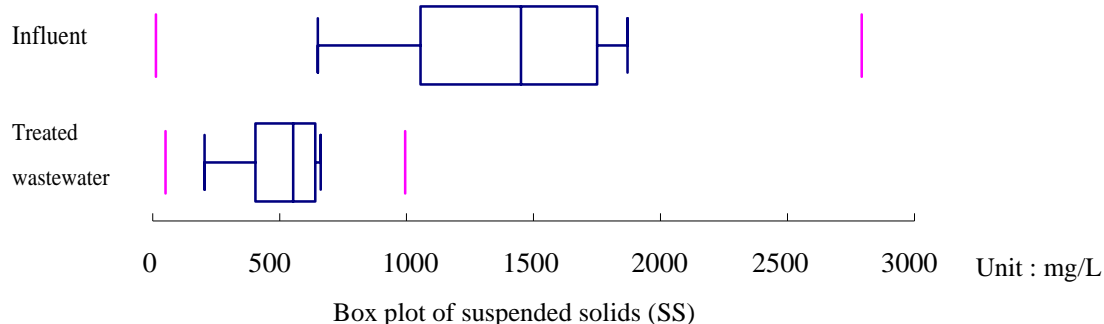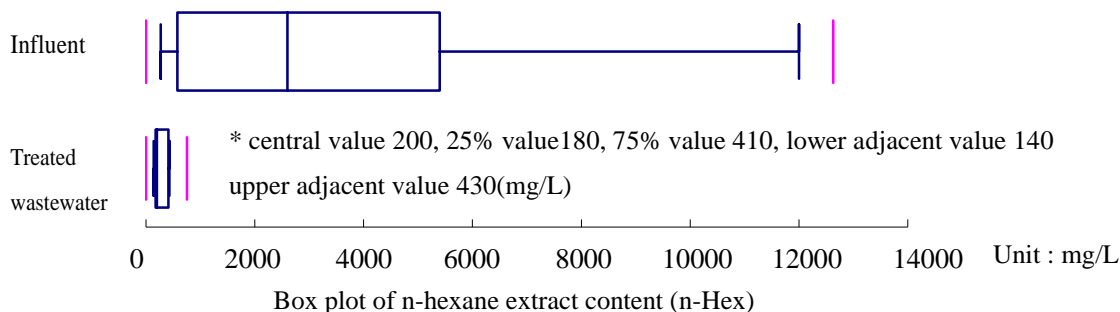
### 3.2 Water quality verification experiment

The content of n-hexane extract (n-Hex) was 270–12,000 mg/L in the influent and 140-430 mg/L in the treated wastewater. The average concentration of this substance in the treated wastewater was 260 mg/L. (All verification experiment data is average 240 mg/L.) The removal ratio was 93%, achieving the target of 90% or more.

The content of suspended solids (SS) was 650–1,900 mg/L in the influent and the average concentration was 490 mg/L (All verification experiment data is average 400 mg/L.) in the treated water, giving a removal ratio of 64%.

Table　Verification examination results of water quality item

| Item / Unit | | n-Hex | | SS | |
|---|---|---|---|---|---|
| | | Influent | Treated wastewater | Influent | Treated wastewater |
| water quality concentration (mg/L) | Minimum to maximum value | 270 ~ 12,000 | 140 ~ 430 | 650 ~ 1,900 | 200 ~ 660 |
| | Average | 3,500 | 260 | 1,400 | 490 |
| Pollution load | g/h | 89 ~ 5,400 | 34 ~ 180 | 190 ~ 650 | 75 ~ 220 |
| | g/day | 12,000 | 790 | 1,700 | 610 |
| Removal ratio | % | 93 | | 64 | |

Influent

Treated
wastewater

* central value 200, 25% value180, 75% value 410, lower adjacent value 140

upper adjacent value 430(mg/L)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 2000 | 4000 | 6000 | 8000 | 10000 | 12000 | 14000 |

Unit : mg/L

Box plot of n-hexane extract content (n-Hex)

Influent

Treated
wastewater

| | | | | | | |
|---|---|---|---|---|---|---|
| 0 | 500 | 1000 | 1500 | 2000 | 2500 | 3000 |

Unit : mg/L

Box plot of suspended solids (SS)

The biological oxygen demand (BOD), a reference item, was 2,600 mg/L in the influent and 1,600 mg/L in the treated water. The removal ratio calculated from the pollution load was 42%.

**3.3 Operation and maintenance item**

(1) Environmental impact item

| Item | Verification result |
|---|---|
| Amount of sludge | No sludge is generated in the treatment process by the verification equipment. |
| Amount of wastes | Workers must dispose of the food residues caught by the scumsave net and the used oil absorbents. |
| Noise | No noise is generated by the verification equipment. |
| Odor | The verification equipment did not produce abnormal odor while it was operating or stopped compared with other odors in the kitchen. |
| Recovery of oil | The recovered oil quantity during the verification experiment was 22 g/day |

(2) Used resources index

| Item | Verification result |
|---|---|
| Oil absorbent | 50 g of the material was used for one cleaning in the verification test. |
| Scumsave net | The net was replaced once every day. |

(3) Operation and maintenance performance item

| Maintenance item | Maintenance time per operation and maintenance frequency | Number of people and skill required for maintenance |
|---|---|---|
| Before use | Setup of Scumsave net (Once two minutes) | One person without any special skills is required. |
| Collection of caught residues | Exchange of Scumsave net (Once two minutes) | One person without any special skills is required. |
| Recovery of oil | Recovered oil by oil absorbent (Once three minutes) | One person without any special skills is required. |

(4) Qualitative remark

| Item | Remark |
|---|---|
| Remark on water quality | Although the oil concentration in the influent fluctuated substantially, it was removed effectively in the treated water. Comparing the oil concentration between the influent and the treated water, the average concentration was 3,500 mg/L in the influent and 260 mg/L in the treated water. When the concentration in the influent was the maximum of 12,000 mg/L, it was reduced to 410 mg/L in the treated water, indicating that the equipment removed the oil at high concentrations very effectively. (See Section 6.2 "Water Quality Verification Items on Page 19 of the Main Paper".) There is no difference in color between the influent and the treated water due to organic matter.  Influent    Treated wastewater |
| Operations required for initiation | The scumsave net must be mounted on the equipment. |
| Operations required for shutdown | The scumsave net must be dismounted from the equipment. |
| Reliability of the equipment intended for verification | No trouble occurred in the verification equipment during the experiment. |
| How to solve the problems | If the scumsave net becomes clogged, the chief worker must remove the residue from it. If the equipment becomes abnormal, contact the manufacturer (verification applicant). |
| Evaluation of the instruction manual of operation and maintenance | The instruction manual for operation and maintenance was easy to understand. The operator could sufficiently understand the equipment and perform proper maintenance. |
| Others | This equipment effectively treats wastewater containing a large amount of food residues and oil and efficiently improves the performance of the grease trap. In addition, the treatment principle is simple, the scumsave net is easy to mount and dismount, and the oil can be collected easily. The used oil absorbents can either be disposed of or used as a combustion improver. |

## 4. Reference information

The information shown in this chapter 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 in this chapter.

### 4.1 Product data

| Items | | Column to be filled in by the applicant for verification | | | |
|---|---|---|---|---|---|
| Name / type | | Scumsavenet &  Oilcatch System NH-KB Series | | | |
| Manufacturer(distributor) | | Sannyu Co., LTD. | | | |
| Contact address | TEL / FAX | TEL (03)3877-1315  /  FAX (03)3877-1316 | | | |
| | Web address | http://www.sannyu.com | | | |
| | E-mail | t.tanaka@sannyu.com | | | |
| Size and weight | | Size: W200mm×D223mm~266mm×H170mm<br>    Various net holders are available according to the position and shape of the influent inlet of the grease trap.<br>Weight: 1.1kg~2.5kg (Depending on the types of net holder) | | | |
| Necessity for pre-treatment and post-treatment | | Pretreatment: None<br>After treatment : Disposal of collected food residues and oil | | | |
| Supplementary facility | | None | | | |
| Life of the equipment | | Usable semipermanently (However, if damaged, the holder must be replaced.) | | | |
| Time for initiation | | The equipment can be used immediately after installation. | | | |
| Approximate cost<br><br>(Maintenance is to be performed by the user) | | Expense item | Unit price | Quantity | Total |
| | | Initial cost | | Total | 39,850 yen |
| | | net holder | 28,000yen | 1 machine | 28,000 yen |
| | | Scoop net | 3,850 yen | Stick of scoop net | 3,850 yen |
| | | Cost for dispatching our instructor for installation (in the Tokyo area and surroundings) | 8,000 yen | 1 place | 8,000 yen |
| | | Running cost (monthly) | | Total | 6,160 yen / month |
| | | Scumsave net [1] | 280 yen / 1piece | 12 pieces | 3,360 yen |
| | | Oil absorbent (2kg) [2] | 5,600 yen / 1box | 1/2 box | 2,800 yen |
| | | 1): When the net is replaced once every three days<br>2): When the absorbent is used 200g once every three days | | | |
| | | Per 1 m$^3$ of treated wastewater | | | 205 yen /day |
| | | Note) The cost depends not on the water volume but on the quantity of food residues and oil. The cost does not include the expenses for disposing of food residues and oil. | | | |

4.2 Other information from the manufacturer

1. Delivery record
   The equipment is used by more than 13,000 facilities including public offices, supermarkets, shopping centers, hotels and restaurants .

2. Innovative spirit of technology
   1999: Obtained utility model registration (Registration No. 3063807).
         Registered as Tokyo Business Activity for Development of Creative Technology.
   2000: Approved as Tokyo Promotion Activity for Development of Creative Technology.
         We conducted tests on removal efficiency based on HASS217 (Standards for "Grease Trap" by the Society of Heating, Air-Conditioning and Sanitary Engineers of Japan).
   2005: Obtained patent (Patent No. 3668894).
   2012: The scumsave net was delivered to over 13,000 facilities.

3. Strong point of the product
   ●Collection of residues
   The scumsave net can catch smaller food residues. (The net has a finer mesh than the conventional ones.) A net holder needs to be mounted on the grease trap to use the scumsave net. For NH-KB series net holders, it is necessary only to adjust the width of holders according to that of the grease trap by turning the butterfly screws to mount the holders. Therefore, they can be mounted or dismounted very easily in most facilities where the one-way pipe inlet faces the front.

   ●Recovery of floating oil
   The oil absorbent used during cleaning has good water repellency and so can collect oil floating on the water surface very easily. In the conventional oil collection method, in which oil is scooped up with a ladle or dipper, it is very difficult to collect only the oil floating on the water surface, and so workers tend to abandon the cleaning and discharge a large amount of oil from their facilities.