○ Overview

Technology intended for verification	Excess sludge reduction system “Ohdelight” (Ohdelight dissolution unit & Exclusive agent Ohdelight T-200)
verification applicants	Shikoku Chemicals corporation
Demonstration institution	Research institute of environment, agriculture and Fisheries, Osaka Prefecture
Period of the experiment for verification	November 1, 2011 to January 31, 2012
Purpose of this technology	This technology reduces the excess sludge generated during wastewater treatment in the activated sludge process.

1. Outline of the technology intended for verification

Operating Ohdelight with its top lid removed.

Ohdelight T-200 tablets are contained in the sludge although they are not visible.

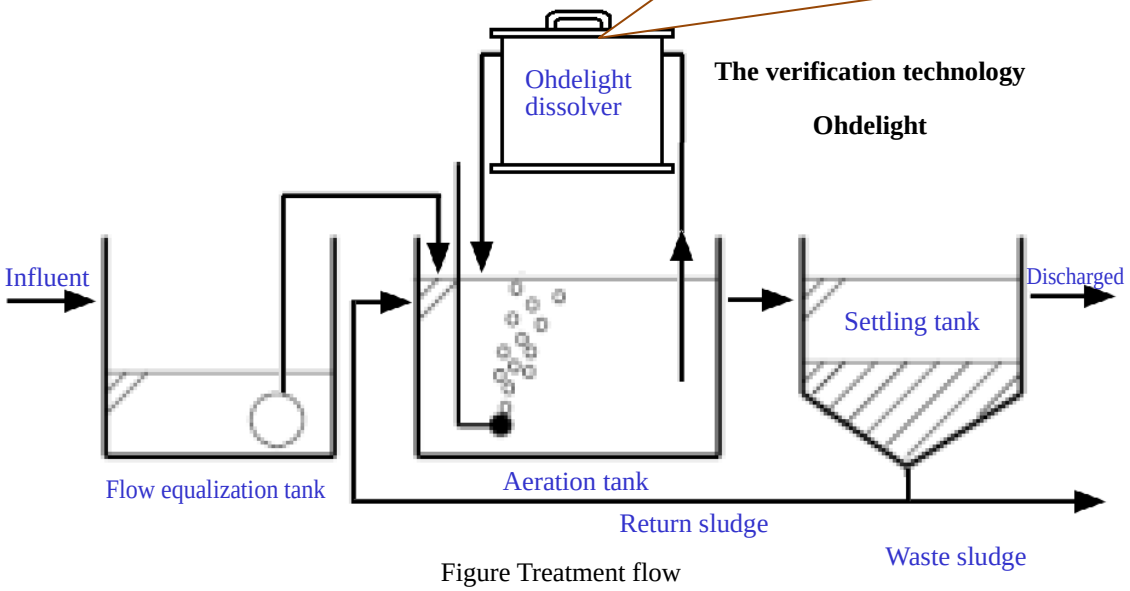


Figure Treatment flow

【Principle】

In the treatment of activated sludge in wastewater, the activated sludge is fed by the airlift pump from the aeration tank to the Ohdelight dissolver. In the dissolver, the activated sludge reacts with the specialized agent Ohdelight T-200, the main component of which is trichloroisocyanuric acid, to make it soluble in water (to dissolve the organic elements in the sludge). Subsequently, the sludge is returned to the aeration tank where it is decomposed and digested as substrate by organisms, reducing the excess amount of generated sludge.

2. Outline of the verification experiment

2-1 Outline of the location for performing the verification experiment

Project type	Treatment of wastewater in agricultural settlement
Project scale	Planned treatment population: 1,150 persons Planned wastewater volume: 380 m^3/day
Address	919 Shimokawara, Nakaku Arata, Taka-cho, Taka-gun, Hyogo
Quantity of wastewater during verification experiment	191m^3/day

2-2 Specification and performance of the equipment used for verification

Category	Item	Specifications and water treatment capacity
Outline of the facility	Size and weigh	480(W)mm×680(D)mm×658(H)mm / 64 kg
	Installation date (month and year)	April, 2009
	Amount of chemical used	Ohdeligt T-200 3.5 kg/day/set or less
Design conditions	Daily wastewater volume	About 1,000 m^3/day/set or less (when inspection is performed once a week) In a previous case, this system treated wastewater of 45 m^3/day, so it can be used for treating less than 50 m^3/day. By adjusting the operating time, Ohdelight can be effectively used according to the daily volume of discharged wastewater.

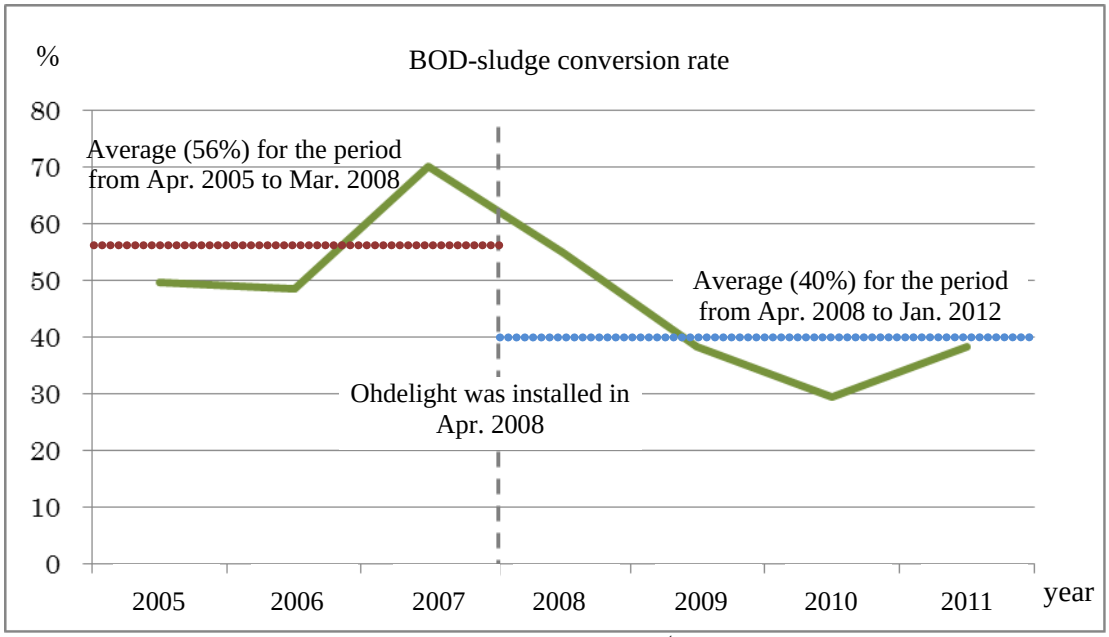
3. Results of the verification experiment

3-1 Water quality verification experiment

(1) Reduction of generated sludge

①Generated sludge volume

The reduction effect of the generated sludge volume was assessed based on the generated sludge volume for the treated BOD load. The average BOD-sludge conversion rate was 56% before installation of the Ohdelight, but it was reduced to 40% after the Ohdelight was installed (see the table below).

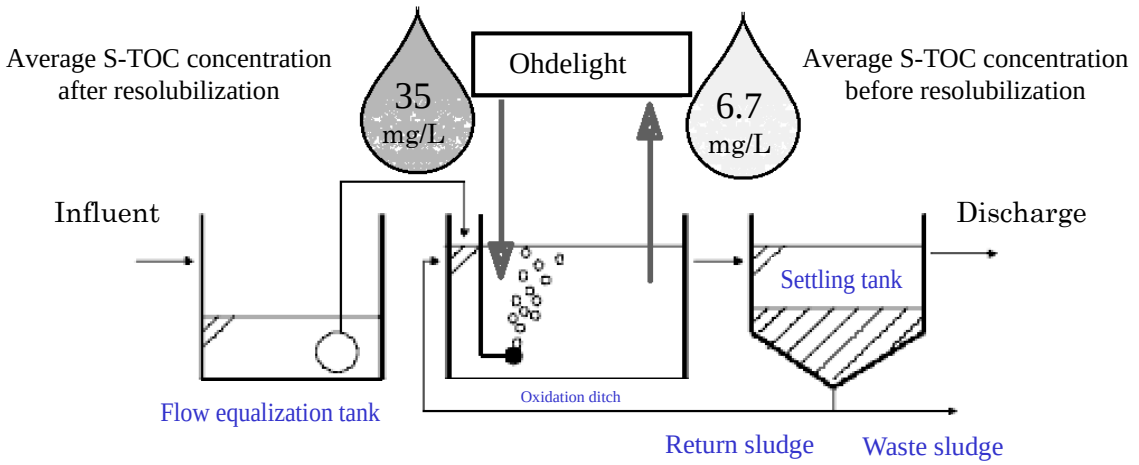


Change in BOD-sludge conversion rate over the years (Ohdelight was installed in Apr. 2008)

②Status of solubilized sludge

The concentration of total soluble organic carbon (S-TOC) was checked in the positions before and after the Ohdelight was installed to see if the sludge was converted by the Ohdelight to substances that can be easily decomposed by microorganisms.

The S-TOC concentration of the activated sludge immediately after contact with the agent in the Ohdelight dissolver for about 5 minutes increased by about 28 mg/L, confirming that the sludge was solubilized.



Increased concentration of total soluble organic carbon by resolubilization

(2) Formation of chlorinated organic compounds by Ohdelight

We assessed the influence on the final effluent by chlorinated organic compounds that could be generated due to the installation of the Ohdelight. Measurement was taken three times during the verification test period, and no trihalomethane was found in the final effluent, indicating that no new hazardous substance is generated by the installed Ohdelight.

3-2 Operation and maintenance item

(1) Environmental impact item

Item	Verification result
Odor	The degree of odor was measured by the human sense of smell and was recorded, and no abnormal odors were detected.
Noise	The degree of noise was measured by the human sense of sound and was recorded, and no abnormal noise was detected.

(2) Operation and maintenance performance item

Item	Verification result
The operation of verification equipment and number of people and skill required for maintenance	The treatment device can be operated, inspected and maintained by one person. In addition, no special knowledge or skills are required. It takes about 30 minutes for one person to conduct a maintenance inspection of the device once a week.
Reliability of the equipment intended for verification	No trouble occurred in the verification equipment during the experiment. If a trouble occurs, contact the manufacturer (applicant for verification).
How to solve the problems	
Evaluation of the instruction manual of operation and maintenance	There are no problems with the manual that must be corrected.

4. 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.

(1) Product date (reference information)

Items		Column to be filled in by the applicant for verification
Name		Excess sludge reduction system “Ohdelight” (Ohdelight dissolution unit & Exclusive agent Ohdelight T-200)
Manufacturer		Shikoku Chemicals corporation
Contact address	TEL/FAX	TEL : 06-6380-4112 FAX : 06-6378-4001
	Web address	http://www.shikoku.co.jp/
	E-mail	yoshidaa@shikoku.co.jp
Size and weight		480(W)mm×680(D)mm×658(H)mm / 64 kg *Influent volume 281m^3/day (This system treated wastewater of 45 m^3/day, so it can be used for treating less than 50 m^3/day.)
Necessity for pre-treatment and post-treatment		None
Supplementary facility		Airlift pump pipe, sludge transportation pipe, drain line, and anti-vibration support for air lift pump
Life of the equipment		6 years
Time for initiation		The equipment can be used immediately after installation.

Approximate cost

Initial cost	Unit price	Quantity	Total
Dissolver body	500,000 yen	1	500,000 yen
Piping material cost	50,000 yen	1	50,000 yen
Work cost	100,000 yen	1	100,000 yen
Subtotal			650,000 yen

Running cost(monthly) (Influent volume:281m^3/day)	Unit price	Quantity	Total
Chemicals	1,500 yen	45 kg	67,500 yen
Electric power cost	21. 54 yen /kWh	130kW	2,800 yen
Subtotal			70,300 yen

Total	(Per 1 m^3 of treated wastewater)	9.41 yen

(2) Other information from the manufacturer (reference information)

●No expensive initial investment is required for this device compared with other methods for reducing excess sludge by solubilization. Only a small initial investment is required to reduce the operating cost.

●The design is compact. This device can be attached to existing wastewater treatment equipment.

●The solubilization quantity can be controlled by adjusting the agent dissolution amount. Therefore, the influence on the treated wastewater due to increased BOD load can be easily controlled.

●This device causes no persistent COD, which is found in some other sludge solubilization methods.

●Maintenance is easy.

[Method for determining the amount of agent used at the location where the verification test was conducted]

Name of facilities: Northern Purification Center, Taka Town, Hyogo Prefecture
Treatment method: Oxidation ditch process

Item	Index value	Remarks
Weight of dried treated sludge (kg/year)	8,000	Average value before installing Ohdelight
Sludge age (days)	50	
Theoretical volume of solubilized sludge when excess sludge is reduced by 100% (kg/year)	12,600	Calculation was made using the publicly known index value.
Amount of agent used when excess sludge is solubilized by 100% (kg/year)	1,830	14.4% for dried sludge weight (Determined in the manufacturer's laboratory test)
Target ratio for reducing excess sludge (%)	30	The value is determined taking into consideration the increased BOD load after installing the device.
Amount of agent used for achieving the target reduction ratio (kg/year)	550	45 kg/month