The Inner Construction method of STP
(The packing of the filter media and the installation of the sprinkling weirs)

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Kitakyushu City Environment Preservation Association

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Reference Date
The japanese traditional installation method of the sprinkling weirs
The installation of the filter media bars

- Length = 1.70
- Interval = 0.125

The 2nd anaerobic tank

The aerobic tank

The cross section of the aerobic tank

- Length = 1.70
- Interval = 0.110

The cross section of
(Improvement point)

Cut away this part for the reason of the following reason:
- this part is inconvenient in the finish work of main gutter construction.
- the bottom edge of this pipe must be up from the water level for exhausting the caused gases in the anaerobic tank.

- water level
- main gutter
- cut away this part (upper area about the both hole)
- gases from the anaerobic tank (offensive odor)
- fresh air
- exhaust pipe
The top of exhaust pipe must be installed at the more high position. The wind is more strong position, it is the best. Case 2 is the best installation place. That reason is followed. The gases (offensive odor) from the anaerobic tank is exhausted early.

The basement of exhaust pipe is followed.

- Exhaust pipe
  - Bad (Rain water is accumulated here)
    - Many harmful insects grow
  - Good (Rain water is not accumulated here)

- Exhaust pipe
  - Good (Rain water is not accumulated here)

- Exhaust pipe
  - Good (Rain water is not accumulated here)

- Liner or curve
The packing of the filter media (Stones)

Filter media over 150 mm must be packed until the 2nd layer from the bottom to protect that small filter media drops down from the opening of filter media over 150 mm. Filter media 100mm–150mm is packed over the 3rd layer.

The thickness of Packing is followed.
1) The 2nd anaerobic tank 1.25 m
2) The aerobic tank 1.0 m

(Note)
The depth of water within the top of filter media and water surface in the 2nd anaerobic tank and the aerobic tank is 0.3 m.

Working photo of the packing of the filter media (Stones)
the packing of the filter media (stones)  
( the 1st layer at the bottom in the aerobic tank )  
the packing of the filter media (stones)  
( the 2nd layer at the bottom in the aerobic tank )  
the packing of the filter media (stones)  
( over the 2nd layer at the bottom in the aerobic tank )  
the measuring of the max packing level  
of the filter media (coaching)  
the finished state of the packing of the  
filter media in the aerobic tank
the packing of the filter media (stones) 
( at the bottom of the 2nd anaerobic tank )

the measuring of the max packing level 
of the filter media (coaching)
The sprinkling weirs must be just installed at the water line (parallel installation).
If the sprinkling weirs are installed in the slope site, sprinkling equally is very difficult.
The special equipment is used in the measuring of water level. The measuring method is followed.

Special equipment of measuring water level.
This is set in one place. Water is put in this.
The measuring is executed by moving colorless pipe and reading water level thoughts in colorless pipe.
This measuring method is applied in the narrow space.
1) Measure the water level about four corners using the special equipment of measuring water level in the aerobic tank. Draw the marking in the water level point. Knock the nail into the concrete about four points. Draw the line between each nails on the wall using the drawing line equipment.

2) Pull the string between the nail

3) Pull the new string between each string over the point of the installation of the sprinkling weirs. The height between this new string and the installation point of the all sprinkling weirs.
nail the new string on the installation point of sprinkling weir

Working photo of the measuring of water level in the aerobic tank (caoching)

The measuring water level using the special equipment of measuring water level

The knocking the nail into the concrete

The drawing the line between each nail

Pulling the string between the nail

Pulling the new string between each string over the point of the installation of the sprinkling weirs

the new string (yellow line)

the installation point of the sprinkling weir

Upper space in the aerobic tank
6  The installation of sprinkling weirs

All sprinkling weirs are connected by the mortar to all installation points of the sprinkling weirs.
Working photo of the installation of sprinkling weirs

1) Preparation

All sprinkling weirs and all installation points of the sprinkling weirs were painted by water proof resin. If the sprinkling weir is installed on the installation point in this state, the sprinkling weir can not be connected by mortar. Therefore, water proof resin must be taken off about the connection part of mortar. If all sprinkling weirs and all installation points of the sprinkling weirs did not be painted by water proof resin, this taking off work does not be required.

The painted installation point (white part)  
Round part must be taken off

Taken off the resin by hammer

The finished state of taking off the resin  
(by handy grinder)

The painted sprinkling weir (white part)  
Round part must be taken off

Taken off the resin by handy grinder

The finished state of taking off the resin
2) The installation of all sprinkling weirs

The installation of all sprinkling weirs is the most important work. The installation work is executed the next order.

(1) Put a little mortar on the both installation point of the sprinkling weir

![Image showing a little mortar](image1)

(2) Put a sprinkling weir on that mortar slowly

There is the installation direction of the sprinkling weir

![Diagram showing V-notch sprinkling weir and adjacent sprinkling weir](image2)

The sprinkling weir is installed in the direction that the V-notch of adjacent do not face each other.

The example of bad installation

![Image showing bad installation](image3)

slowly putting on
(3) Measure each installation interval by scale

If that interval is different, shift the sprinkling weir slowly

(4) Measure the horizontal installation by handy water level meter about both side direction and vertical direction
And the measuring of the height between the top of sprinkling weir and the new string by scale about both edge of sprinkling weir

If that state is different, adjust to horizontal installation by knocking sprinkling weir using hammer or insert a little mortar between the bottom of sprinkling weir and base.
(5) Fix a sprinkling weir to the point of the installation point.
Insert a little mortar to the opening between both side of the sprinkling weir and close the opening.

![Insert a little mortar](image1)

Note

- Do not touch this fixed sprinkling weir.
- The opening between both side of the sprinkling weir and the installation point is not closed perfectly. But this opening is closed perfectly in the later work.

![Diagram](image2)

(6) Continue the work from (1) to (5) until all sprinkling weirs is installed.
Check the horizontal installation state of sprinkling weir using the water level meter when several sprinkling weirs were installed.

![Checking the horizontal installation](image3)

the installation of the last sprinkling weir
(7) Reinforce coarsely the opening and the lack of mortar by the new mortar. Reinforce coarsely the wall of gutter by mortar using several small clamps.

The reinforcement of the lack of cement reinforce wall of main gutter

Wooden panel
Main gutter

Reinforce red part by new mortar (closing the opening)

The construction of wooden panel for reinforcement of the wall

Construction small clamp

Hand-made clamp (made of construction steel)

The reinforcement of the lack of mortar (coarsely)

The reinforcement of the opening about the both side (coarsely)

Wait until the mortar is hardened.
(8) Finish the surface of drying mortar by the new mortar finely

the taking off the wooden panel

the finish the surface of drying mortar finely

the finish the surface of drying mortar finely

Waite until the mortar is hauden

Finish the surface of this mortar using water-proof cement after drying
Continue this finish several times

water-proof cement

the thickness of finish per one finish

the finish the surface using water-proof cement
It needs to be care of installing the sprinkling weir. The most important thing is to instal the sprinkling weirs horizontally. But there is the disorder in the base, for example lough or slope. So, it is very important to check the horizontal state of the base before installing the weirs. At first, measure the hight between the base and the new string at several points (see the below figure).

If there is the different hight, establish the shortest hight point as the standard hight of installing. And install all weirs as standardizing this shortest hight.

If you standardied the longest hight and installed the weirs, you must shave the bottom of weir or shave the surface of the installation bas at the point of the shortest hight. The installation construction of weirs is very easy and first in this method.
The fine adjustment of dropping water from the sprinkling weirs

The fine adjustment of dropping water from the sprinkling weirs is the work to shave the V-notch of the sprinkling weir for the purpose of equal sprinkling. This adjustment is the most important work and done after drying the mortar.

At first, look the sprinkling state from all V-notches. If there is V-notch of little sprinkling (not equal sprinkling), shave the bottom of that V-notch by hammer or steel file until equal sprinkling.

Note: the shaving work must be done as flowing the tap water little by little.

Hammer or steel file is used in the case of next work.

- Hammer: rough shaving of V-notch
- Steel file: fine shaving of the bottom of V-notch
- Handy grinder: both shaving of V-notch

The water from the V-notch in the sprinkling weir must be dropped down equally drop by drop.
Working photo of the fine adjustment of dropping water from the sprinkling weirs

Work1  Clean up on the sprinkling weirs

Work2  Pour the tap water into the main gutter

Work3  Finished state of pouring

  Check the water leakage from the main gutter
  Look the sprinkling state about all V-notch of the sprinkling weirs
  Search V-notch that does not sprinkle the water and draw the marking about that V-notch

Work4  Shave the bottom of that V-notch coarcely using handy grinder little by little (Coaching)

  Note: Shaving must be done alternately in the side of the bottom of V-notch

  shave alternately

  V-notch

  worker’s shaving using handy grinder
Work 5  
Shave the bottom of that V-notch finely using handy file little by little.

Work 5  
Confirm the equal sprinkling from all V-notches  
If the water is sprinkling equally, all surfaces of stones are wet.

the surface of stones that are sprinkled  
It is good condition that many aerobic bacterias exist.

The surface of stones must be kept wet all the time.

Work 6  
Discharge the water from the main gutter  
Paint the water proof resin on the shaving part after drying.

The suggestions

The another work for the adjustment of equal sprinkling

There is the adding method except the shaving method (this work).  
The adding method means to add the water proof paint on the bottom of the V-notch.  
This method is applied in the case of reforming a extreme V-notch caused by constructed inaccurately.

The construction of the sprinkling weir

1) The adjustment of dropping water is decided to construct the accurate V-notch. The adjusting work is first and easy at the accurate V-notch.

It is very important to construct this part accurately  
And this length must be keep accurate.

2) The construction steel into the sprinkling weir must be arranged rightly.

the bottom of V-notch  
this length is over 0.005 m  
because there is a fear that the construction steel is brought to light by shaving the bottom of V-notch.

If the steel is brought to light by shaving, paint the water proof resin enough to protect the corrosion of steel.
The Japanese traditional installation method of the sprinkling weirs

1. The different construction thing as compared with Japanese traditional construction

   - The waterproof resin is not painted (the waterproof resin is painted in the last work)
   - The installation point of the sprinkling weir

   - This base is flat
     (the installation point of sprinkling weir is not installed in advance.)

2. The installation of the sprinkling weir
   1) Preparation of several pieces that are installed between sprinkling weirs

   - The construction material made of rectangular burned clay piece is used in Japan.
     - a rectangular burned clay (b > a)
     - cutting or breaking to small several pieces (same thickness)
     - It is able to make this small piece yourself using the mortar

   - The thickness of a small piece is within the following width...

   - The Japanese traditional installation method of the sprinkling weir

   - Reference Date

   - work1
     - fit a little mortar
     - one piece

   - work2
     - press and slide slowly

   - wall of the main gutter
3 The character of the Japanese installation method

1) the opening is a little.

2) the work is easy and fast.

3) the adjustment of the interval between sprinkling weirs is easy.

4) It can insert a foot between sprinkling weirs
   The working (repair, painting) is easy because the worker can move between sprinkling weirs.

5) A small piece is used as "spacer"