

Research on the membrane panel type-air supplier

Whole term

2002.7~2004.3

(Purpose)

According to an agreement on climatic changes (COP3: Kyoto conference on prevention of global greenhouse effect), Japan should reduce 6 % of the total green house effect gas emission. Therefore, many arguments on how to control the emission were raised. In August 1999, the Ministry of Construction (Ministry of Land, Infrastructure and Transport at present) submitted such promotion to prevent global warming which implied that there was a vast trend to suppress greenhouse effect gas emission.

This air supplier is so effective in oxygen transfer that a reduction of gas emission rate can be expected. It is cost effective too.

In this research, as per the results of actual investigation data, the object clarified the technical skill of the membrane panel type-air supplier and (ordered) the engineering manual.

(Last year)

The characteristics of the membrane panel type-air supplier, consumed electric power of the wastewater treatment and the applicable treatment type were reported.

(Study)

In this year, the design value of the oxygen transfer effectiveness and the operation manual on how to prevent loss or gain of pressure were investigated. Then, these things were arranged as an engineering manual.

1. Examination of the oxygen transfer rate.

The best point with this air supplier is the high oxygen transfer rate. In detail design, the design value was made referring to the results of the sampling data, as mentioned in the following table Table 1. Design value of oxygen transfer rate

Aeration type	Depth of supplier(m)	Oxygen transfer rate (%)	
		Design coping with nitrification	Standard design
Surface aeration	5.0	28	31
Centrifugal blower	5.0	26	30

2. Examination to control loss or gain of pressure

To make membrane panel type air supplier durable, it is necessary to check the operation to prevent pressure loss and gain.

Automation of the control is a fundamental rule. And it is necessary to set up auto-control valve of air cut-off valve and emitting pressure valve. Figure1 depicts the flowchart of the concepts to handle pressure loss and gain.

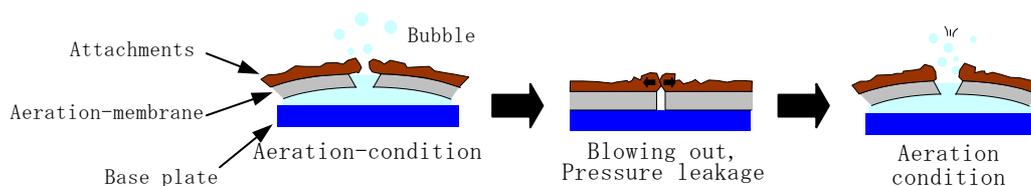


Figure 1 The concept of controlling loss or gain of

3. The effect of the application (model design and actual results)

A model case of different blower was set, and the work of model design was confirmed, There was 30%~ 40% reduction in the necessary aeration and electric power of the plate, 10~15% reduction in the necessary aeration , 50~55% reduction in the electric power of the submerged aerator.

Model case : Surface aeration and centrifugal aeration with or without nitrification.

Condition: Conventional activated sludge, flow rate: 10,000 m³/day X 8, reactor size W 7.5 m X L 80 m X H 5.5 m

Comparison: Surface aeration - Plate type, submerged type

Centrifugal aeration - Plate type

It was found that it could cut down 30-60% of the general aeration.

Collaborators: Japan Institute of Wastewater Engineering Technology

Ebara Corp., Kawasaki Heavy Industries, Ltd., Kubota

Corp., Kobe Steel, Ltd., Sanki Engineering Co.,Ltd., Suido Kiko Kaisha,Ltd.,

Sumitomo Heavy Industries, Ltd., Takuma Co., Ltd., Tsukishima

Kikai Co., Ltd., NGK Insulators, Ltd., NKK Corporation, Hitachi

Metals, Ltd., Hitachi Plant Engineering & Construction Co., Ltd.,

Maezawa Industries, Inc.

Personnel in charge of the study: Ryuichi Takahashi, Gen Tsuchiya, Tsuyoshi Inoue, Hiroshi Nakamura

Keywords

Oxygen transfer efficiency, Operation for prevention of the pressure increase, Prevention of global warming