

Energy saving MBR using thin PVDF hollow fiber membrane

Mitsubishi Chemical Aqua Solutions Co., Ltd., Swing Engineering Corporation, Mitsubishi Kakoki Kaisha, Ltd.

Technology overview

The new MBR system enables energy-saving and adaptability to inflow load fluctuations. Applying thin PVDF* hollow fiber membrane with higher integration than the conventional membranes, aeration with low air volume for membrane washing, and an auxiliary ultrafine aeration contributes to new features.

*PVDF : Polyvinylidene Difluoride

Flow diagram

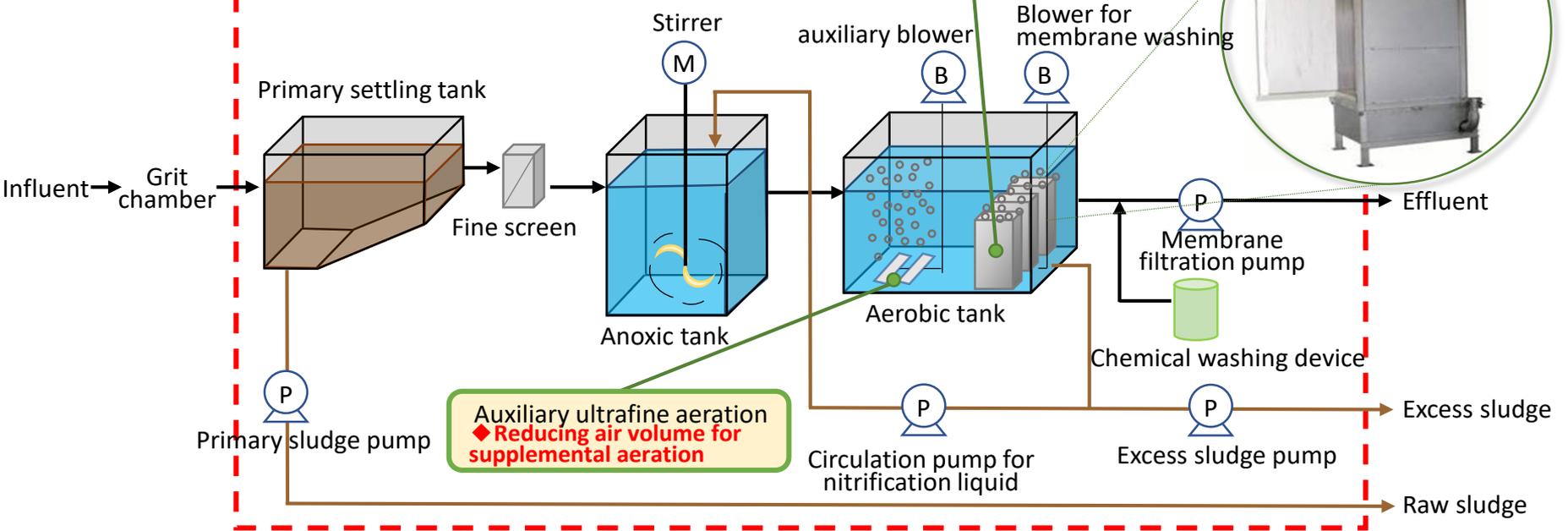
The smaller diameter membranes of 1.65 mm increase the module membrane area by 1.6 times compared to conventional membranes of 2.8mm.

Scope of the system

Membrane unit using "Thin PVDF hollow fiber membrane" and "Low airflow membrane washing diffuser"

- ◆ High flux
- ◆ Reducing air volume for membrane washing
- ◆ Adaptable to inflow load fluctuations

Auxiliary ultrafine aeration
◆ Reducing air volume for supplemental aeration



*Coagulant addition facilities are required for phosphorus removal.

Features of the system

- **Reduction of aeration air volume for membrane washing and air volume for auxiliary blower**
Adopting highly-integrated thin PVDF hollow fiber membranes, a low air volume membrane washing aeration system, and an ultrafine bubble auxiliary aeration system reduces air volume.
- **Cost reduction by reducing the number of membrane units**
Reduction in the number of membrane units by using highly integrated thin PVDF hollow fiber membranes that are 1.6 times more compact than conventional membranes

Scope of application

Wastewater to be treated	Urban wastewater, mainly domestic wastewater (regardless of the removal system)
Facilities' capacity	Medium to large scale with a design maximum daily inflow of 3,000m ³
Influent temperature	13°C or more (Annual minimum of monthly average water temperature)
Treatment system	Modified Ludzack-Ettinger process MBR
Range of inflow load fluctuation	1.4 times or less of design maximum daily inflow (Twice a day of the continuous 4 hours' peak flux)

Benefits

- **Achieve energy-saving operation**
Reduction of aeration air volumes for membrane washing and for auxiliary blower achieves power consumption of less than 0.4 kWh/m³ per treated wastewater volume.
- **Reduce initial costs and membrane replacement costs**
Reduction of the number of membrane units reduces initial costs and membrane replacement costs.
- **Stable operation**
In addition to the inflow fluctuation at normal time described in the scope of application, 1.4 times of the design maximum daily inflow and 24 hours continuous operation assuming rain weather is possible (daily average flux of 0.84m³/(m²·day))