

## Dissolved Oxygen Measurement in Continuous Aeration Sewage Treatment

**Industry:** Wastewater  
**Product:** Dissolved Oxygen Analyzer

### Introduction

When used to measure the dissolved oxygen in an aeration tank, sensors tend to quickly become contaminated and need frequent cleaning. A cost-effective solution to this problem has finally been found with the development of the Yokogawa DO402 Dissolved Oxygen Converter system. With this system, the sensor is mounted in a float ball holder that protects it from contamination and enables continuous maintenance-free use for extended periods.

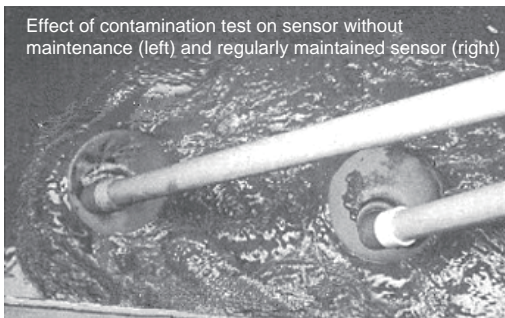
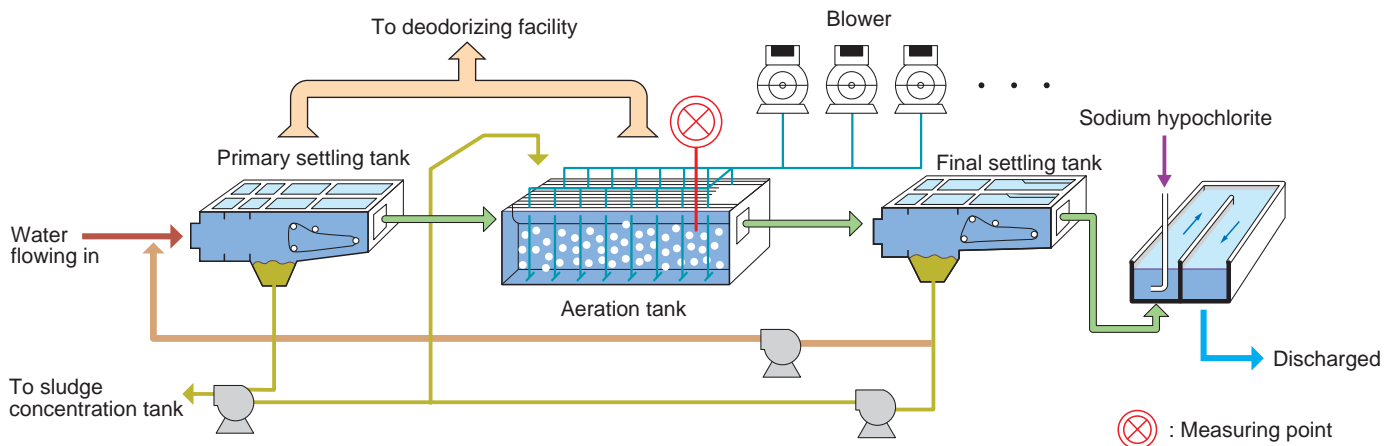
### Expected Benefits

- Continuously and stably measures dissolved oxygen concentration
- Reduces operating costs
- Eliminates the need for manual cleaning

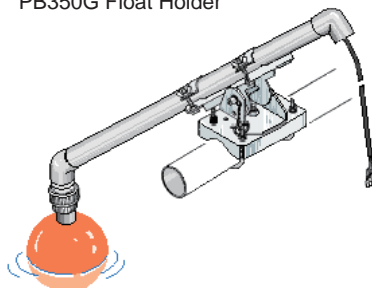
### Process Overview

Sewage that flows into a treatment plant is sent to a primary sedimentation tank to remove the garbage and sludge. Thereafter, it is routed to an aeration tank where activated sludge (sludge containing bacteria, protozoa, and other microorganisms) is added and air is blown into the mixture to agitate it. The microorganisms in the activated sludge thrive on the oxygen and cause the organic substances in the sludge to proliferate and the generated solids to be precipitated. A shortage of dissolved oxygen (DO) will kill the microorganisms, so the DO concentration in the aeration tank must be properly controlled. A DO analyzer is used to continuously measure the DO concentration.

### Sewerage treatment procedure



PB350G Float Holder



The spherical float stays relatively clean because contaminants are washed off by the surface-level flow of water. The sensor diaphragm is kept relatively free of contamination as it is positioned at the same height as the top portion of the float.



## Solution Details

### Measurement System

Detector: DO30G-NN-50-□□-PN

Float holders

Angled type: PB350G-PV-25-NN

Vertical type: PB360G-PV-□5-NN

Converter: DO402G-1-□-E/□

Terminal box (as needed): WTB10-DO3-NN-□□/□

With the WTB10 terminal box, the sensors and the converter can be up to 50 meters apart.

### Utilities

Power supply: 100 V AC  $\pm$  15 %, 50/60 Hz

115 VAC  $\pm$  15 %, 50/60 Hz

230 VAC  $\pm$  15 %, 50/60 Hz

Power consumption: max. 10 VA

### Precautions

- The measuring point must be at a location where air bubbles are not a frequent occurrence.
- To prevent the sensor diaphragm from being damaged by solids in the sample liquid, the arm of an angled float holder should be pointed in the downstream direction.

## Field Data

### No effects of contamination after four months of continuous operation

We conducted a test with two DO30G sensors that were equipped with the PB350G Float Ball Holder. During the test, no maintenance was performed on one of the DO30G sensors, while the other DO30G sensor was cleaned every two weeks and calibrated monthly. Over the entire duration of the test, the DO30G sensor that did not receive cleaning showed minimal contamination. Furthermore, its measurements did not deviate appreciably from those of the sensor that was regularly maintained.

