

Sustainable river cruises on European waterways

Dissolved oxygen measurements in sewage treatment plants on river cruise vessels

Industry: Maritime

Application: Sewage treatment

Hamilton products: VisiFerm DO Arc



River cruises are popular. More than half a million passengers enjoy the slowly changing landscapes and unique travel experiences of European river cruise vacations every year. During these tours, passengers and crew consume and pollute drinking water, which results in the ship's wastewater. The wastewater is a combination of toilet, sanitation, galley, and laundry water. When discharged untreated into surface waters, the oxygen-consuming wastewater has a negative impact on the environment.

To protect these fragile ecosystems and sustainably preserve their touristic value, the European legal framework (Commission Directive 2012/49/EU) prohibits the discharge of untreated wastewater into the surface waters. A certified sewage treatment plant (STP) on board of the cruise vessel is mandatory. The following values for the outflow of the on-board STP are in place: biological oxygen

demand (BOD5) 25 mg/L, chemical oxygen demand (COD) 125 mg/L, and total organic carbon (TOC) of 45 mg/L. All these parameters have to be measured in a homogenized random sample. Compliance can be checked unannounced by the authorities and non-compliance is fined. Therefore continuous monitoring and optimization of the STP is paramount.

PureBlue, supplier of biological sewage treatment plants, developed PureControl++ as a unique service to ease customer's worries on STP performance. This remote monitoring platform enables PureBlue to constantly analyze and fine-tune the installations. This proactive approach ensures that problems are dealt with before they can cause any damage, with clear cost savings as a result. At this point Hamilton sensors come into the game to allow for accurate monitoring and optimum process conditions.



BENEFITS

VisiFerm DO Arc

- ▶ Optical technology
- ▶ Direct 4-20 mA output
- ▶ Calibration lasts for a long period of time
- ▶ Easy maintenance
- ▶ Various shaft lengths suitable for most applications



How it works

Aerobic bacteria are the driving forces in the biological treatment of the wastewater. These organisms are fixed to special carriers with a large active surface, which swirl through the water in a moving bed bioreactor (MBBR). The oxygen is added to the process and dissolved in the swirling wastewater. This ensures the optimal metabolism of oxygen and reduction of COD by the bacteria, resulting in highly efficient wastewater treatment. Furthermore, this particular growth on carriers also ensures extra protection of the bacteria, leading to a very robust wastewater purification system and limited sludge production. Therefore, the dissolved oxygen in the water is a determining parameter for the efficacy of the entire process.

How VisiFerm DO helps to optimize the STP

The optical sensor VisiFerm DO Arc provides accurate and stable measurements of the dissolved oxygen in the dirty wastewater. The sensor is not prone to contamination and remains calibrated for long intervals. The low maintenance is a big advantage when operating mobile STPs all over Europe. A micro-transmitter is integrated in the sensor head. This enables a direct connection via the 4-20 mA interface to the process control system without the need for an external transmitter. The 425 mm long sensor shaft is an advantage because of the fluctuating water levels in the tank. The use of shorter sensors would require their installation below the water level, resulting in the need for more expensive retractable housings. The long sensor shaft therefore, provides a cost efficient (dis)mounting and easy handling for control and maintenance. This reliable sensor enables PureBlue to continuously monitor and fine-tune the installations providing clean effluent for sustainable river cruising.



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