

Effective Diffuser Liquid Cleaning Optimizes Plant's Aeration Performance For UK Utility Company

Xylem Sanitaire diffusers are designed to provide highly efficient and reliable biological wastewater treatment. A large UK private utility company responsible for providing public water supply and wastewater treatment to the majority of southern England recently approached Xylem to enquire about what it could offer to improve or restore the performance on their Sanitaire fine bubble diffused aeration systems. Diffuser fouling and scaling issues were causing less effective treatment, rising energy costs and additional strain on key ancillary equipment, especially the blowers.

Challenge

Fouling can be characterised by clogging of the diffuser pores on either the air fed side or the wastewater side. Eventually the accumulation of foulant in the diffuser pores reduces the size of the pores and this, in turn, increases the head loss across the diffuser (referred to as "dynamic wet pressure"). This resulted in the blowers overworking to deliver sufficient air volume to meet the treatment system's dissolved oxygen (DO) targets.

Traditional diffuser cleaning methods are expensive, time consuming, inconsistent, and labour intensive. Also with these traditional methods, aeration tanks must often be fully drained in order to perform manual cleaning, thereby disrupting the treatment process and potentially placing the plant's process compliance at risk.

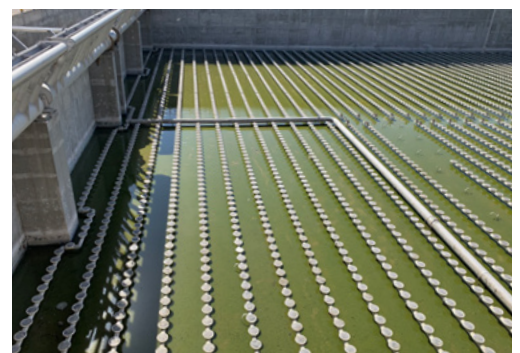
Solution

The UK utility company commissioned Xylem to perform a Diffuser Liquid Cleaning Service on its aeration system. The service uses mobile cleaning units, developed in-house by Xylem, that allow for effective diffuser cleaning during active aeration operation. The major advantage of the Xylem process is that it runs whilst the diffusers remain in operation, allowing for no disruptions to the process due to draining basins or any necessary component removal.

COUNTRY: England
APPLICATION: Aeration
SOLUTION: Sanitaire Diffusers
YEAR: 2020



Clean versus dirty diffuser.



The cleaning process is fast and efficient through the injection of small amounts of acid, which is atomised in the pipework at its drop legs and transported by air to the diffusers. The atomised acid attacks and dissolves any minerals and biological fouling that it comes into contact with, thus opening up the diffuser pores to allow for more air to enter the effluent to improve performance. The acid utilised does not cause damage to stainless steel or PVC pipework, and it can be safely discharged to the environment with the treated wastewater.

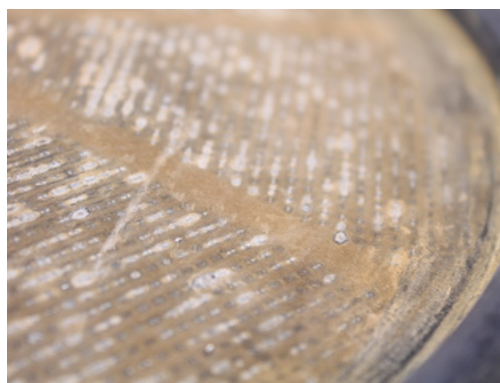
Following the cleaning process, backpressure on blowers is greatly reduced, significantly lowering energy consumption.

Results & Customer Benefits

Once the process was complete, Xylem immediately provided the utility company a full report with data related to efficiency improvements.

With the implementation of the Xylem Diffuser Liquid Cleaning Process, airflow delivered by the utility's aeration system increased 65%, with 97% of the system's original performance recovered.

The system's DO target set points are now easily achievable with the diffusers returned to near optimum performance.

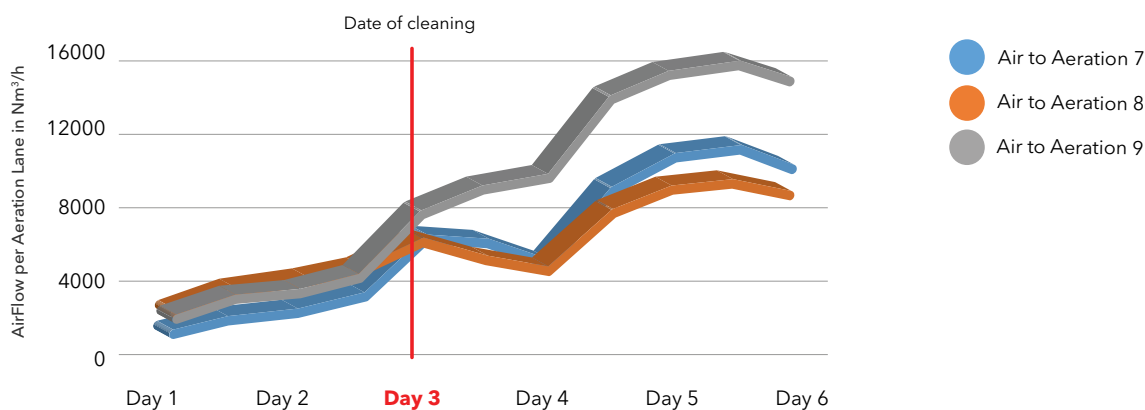


Dirty membrane.



Clean membrane.

After cleaning event in 2020, the air flow through the cleaned lane (lane 9) has doubled.



In addition to the direct energy savings associated with reducing the dynamic wet pressure across the membrane and the resulting increased delivery of airflow, there were also cost savings associated with blower operations. Following diffuser cleaning, the blowers were delivering up to twice as much air into the tanks as they had at the same power consumption prior to cleaning. With less physical strain on the blowers, a reduction of costly blower maintenance and overhaul events can also be expected.

Biological treatment systems are energy intensive, consuming 50 - 80% of the total energy required by a typical municipal plant. Xylem's Diffuser Liquid Cleaning Process, which has been developed for Sanitaire's membrane diffusers, not only improves a biological treatment plant's performance but also delivers significant energy savings.