

Fővárosi Csatornázási Művek Zrt. – Wastewater Treatment Plant Budapest CJSC

Letter No.: R-2100156616

To: LLC "Ekoszvív Center Kft."

Subject: Statement from the operating organization – experience of using the APKV Ekoton aeration system

Dear Mr. Director,

As a feedback to your inquiry about the results of using the APKV Ekoton aeration system, we can report the following:

The Southern Wastewater Treatment Plant in Budapest, with a capacity of 80,000 m³ per day, operates on the basis of the technology of biological wastewater treatment using activated sludge and aeration system regulated by the content of dissolved oxygen in 8 cascade aeration tanks.

Until the end of 2018, we used exclusively membrane aerators in the aeration system, and aerators of this type required replacement due to aging. After studying the international market, we decided in favor of using APKV tube air diffusers developed by EKOTON and having the best technical specifications.

In 2018, the EKOTON aeration system with APKV air diffusers was installed in the L4 aeration tank as the first step, and then in 2019 and early 2020, the same air diffusers were installed in the remaining 5 sections (L1-L3 and L5-L6).

Our experience with membrane diffusers after several years of operation can be described as follows:

- Stretching of membrane plates;
- Loss of elasticity of membrane plates;
- The size of the air bubble increases due to the increase in the size of the perforation, and as a result, the oxygen dissolution efficiency decreases;
- Physical damage, rupture of membranes;
- Lack of oxygen at high loads;
- Physical cleaning of the contaminated surfaces of the membranes does not fully restore their performance.

In order to maintain the required level of dissolved oxygen in the membrane aeration system, we had to empty the aeration tanks to inspect the membranes, clean them, and, if necessary, replace damaged membranes every two years. The main goal of replacing membrane aerators was to reduce excess maintenance costs of the aeration system.

The original APKV Ekoton air diffusers were installed in the L4 aeration tank, which was 1/6th of the capacity (13,333 m³/day) of the total activated sludge flow rate. This was done for the purpose of comparison with the existing membrane system.

APKV Ekoton air diffusers showed stable operation, the required intensity of aeration, the required parameters for oxygen saturation were achieved at a lower air pressure. SSOTE was 5 - 6.3%/m depending on the current air flow rate. The overall air consumption was reduced.

An additional positive effect was the significantly higher adaptability of the APKV Ekoton system in terms of air supply regulation. New aeration system made it possible to more precisely and flexibly follow the changing oxygen demand, which makes it much easier to control the process and provides the necessary air supply, even during peak load periods.

As a result of the positive experience of operating the aeration system in the L4 aeration tank in 2019, a complete replacement of the aeration system was carried out in the same year and in 2020; APKV Ekoton air diffusers were installed in the entire activated sludge system.

Experience in operating the aeration system using EKOTON air diffusers:

- Constant oxygen supply in the required amount during peak loads, DO 3-4 mg/l (including the last 8. cascade);
- Max. working pressure 535 mbar;
- Reduction of pressure losses;
- The air diffusers retain their shape, they are resistant to mechanical damage and corrosion;
- The air diffusers do not get clogged.

Summarizing the above, it can be affirmed that the use of APKV Ekoton air diffusers significantly reduces the need of service, and also meets the requirement for dissolved oxygen in activated sludge aeration tanks while reducing energy costs.

Budapest, August 2, 2021

Signatures:

1. Oszoly Tamás, Deputy General Director of the Water Utility for Technical Issues
2. Gerófi-Gerhardt András, Head of Department