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## **RECOGNITION AND DETERMINATION OF HYDRODYNAMIC DEFICIENCIES IN THE BIOREACTORS OF A REAL WASTEWATER TREATMENT PLANT BY A COMPREHENSIVE APPROACH: LIVE ANALYSIS USING COMPUTATIONAL FLUID DYNAMICS**

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### **Abstract**

The paper presents the results of research conducted on the technological analysis of bioreactors operated at the Iasi wastewater treatment plant (WWTP) and based on them, some proposals for the intervention works needed to improve the technological process, proposals that were subsequently developed. The Iasi WWTP process is using, in the advanced biological stage, an artificial biological treatment with an activated sludge aerobic process, with continuous recirculation. The treatment process scheme is of A2/O type, including a nitrification-denitrification process, so named because it includes 3 distinct areas (anaerobic, anoxic for denitrification and oxic for nitrification). The biological treatment processes are complex, and in the development of the processes intervene physical, hydraulic, chemical and biochemical phenomena. The role of active sludge bioreactors is to remove the non-sedimentable organic compounds, to stabilize sludge organic matter, and to decrease the load of nitrogen and phosphorus-based nutrients from wastewater. Therefore, to gain a higher efficiency and to reach lower operating costs, there is a need for a more uniform flow and distribution of the poly-phase environment, with uniform aeration and a constant transit time for aeration tanks. The parameters being studied within the research program were: flow regime in bioreactors, transient flow distribution in bioreactors, retention time in bioreactors, air distribution in the aerobic area, the state of active sludge bioreactors, reliability of measuring and control devices and all related facilities.

*Key words:* activated sludge, aeration tanks, ANSYS, wastewater treatment plant

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