

BACS

BIOPROCESS AERATION CONTROL SYSTEM



The Bioprocess Aeration Control System (**BACS**) is a 4.0 software solution that gives operators unprecedented automation performance and reliability, as well as maintenance insight for the blowers, instruments, valves, and diffusers. The solution uses customized models which are continuously calibrated in real-time to mirror the insitu behavior of the associated components. The resultant digital twin(s) supports a range of outcomes from automation, to management, and design.

BNR processes require precise and accurate process (DO) control. Further, the complex nature of the aeration system extends beyond what can be effectively serviced with conventional controls. The advancement to system wide modeling and tactical commands provides stable and tight automation, even under dynamic loading and changing process setpoints, all while eliminating excessive wear and tear on equipment.

BACS uses airflow and DO measurements to calculate changes in oxygen uptake rate (OUR) over a specified time increment (typically 7 to 15 minutes). The system calculates the airflow required for each control zone and sends a total airflow setpoint to the blower controller. Once the blower responds, valves are adjusted to distribute the air as required to each aeration zone. There is no limit to the number of aeration zones that can be controlled.

Flow control of the blowers and dynamic most open valve logic ensures that the blower is operating at the lowest possible system pressure. This minimizes energy use and maximizes the output capacity on the unit.

The operating digital twin supports a number of intelligent outcomes including fault detection analytics and reliability-centered maintenance. For operating plants with **BACS**, the elusive aeration alpha factor is now a known design value for future system planning and design.



Maximized Capacity • Energy Savings • Nutrient Removal

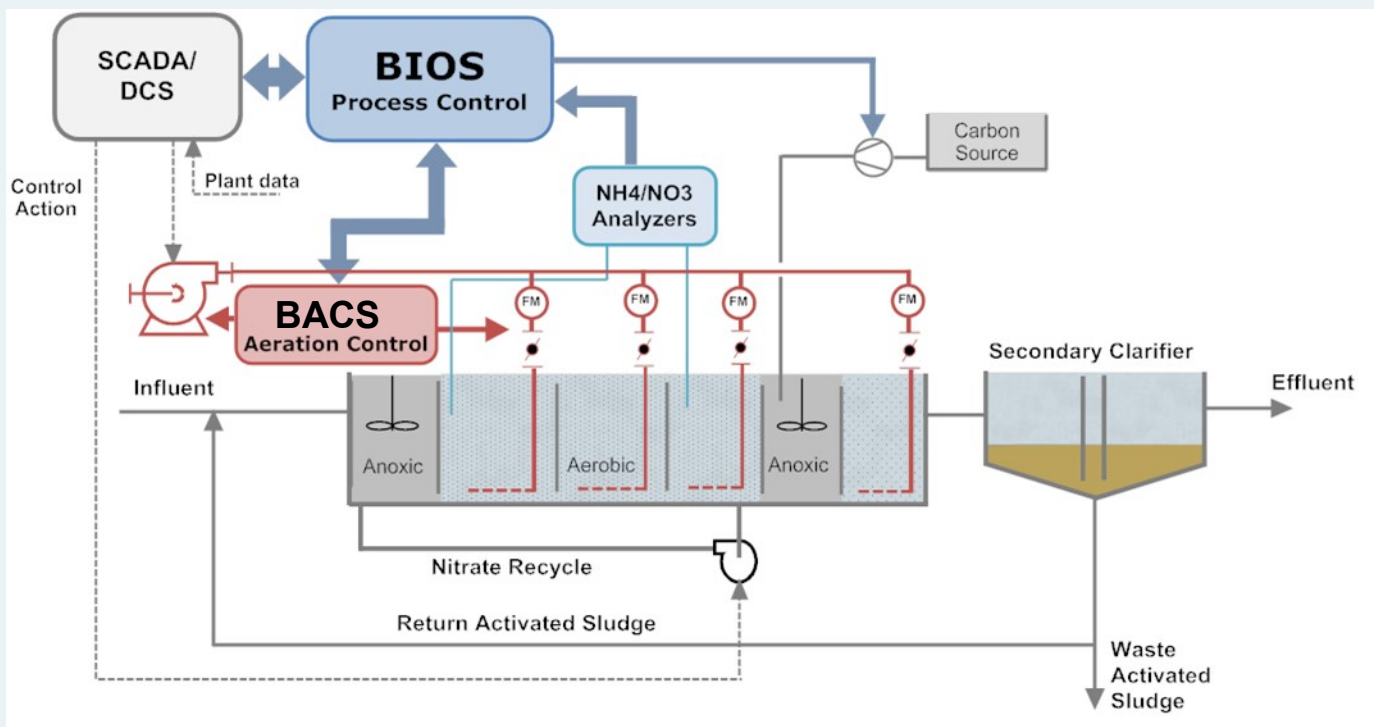
BENEFITS

- Precise and accurate automation performance (within 0.5mg/L, 95% of time)
- Supports high demand fluctuations from varying load and changing DO conc
- Maximizes blower capacity and minimizes energy use
- Reduces wear and tear on equipment (actuators, valves, and blowers)
- Supports complex systems and eliminates manual retuning requirements
- Robust uptime performance
- Reliability-centered maintenance prompts
- Direct software upgrade for existing aeration control systems
- Supports all aeration systems

FEATURES

- Tactical, 1st principle model(s)
- Calculates airflow based on zone specific demand, environmental conditions, and real-time operating performance of diffuser components
- Uses predictive logic to determine future requirements
- Blowers operate to a defined airflow output
- Air distribution valves operate in unison and move to a known position
- Stable operations with advanced fault detection and user embedded IR protocols
- Performance trending prompts maintenance

*guaranteed automation performance when installed with right-sized equipment, patented [US and CN]



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