OSCAR process performance optimizer with VEMA Controller is a tailor-made control system for Sanitaire CASPERON conventional activated sludge solution. The VEMA controller maintains more precise control of dissolved oxygen (DO) levels for plants with fine bubble diffused aeration where the amount of air needed for mixing exceeds the amount of air required by the biological process (mixing-limited conditions).

Did you know that mixing-limited conditions in your aeration basins can result in wasted energy and/or difficulty achieving biological nutrient removal?

If you can’t measure it, you can’t control it. Robust WTW/YSI sensors are used to measure dissolved oxygen and temperature for each reactor basin in the system. The controller combines this data with airflow measurements to identify mixing-limited conditions. The OSCAR system uses more data from the sensors than just the process variables, because smart sensors should mean smart control.
Dissolved Oxygen Control in Mixing-Limited Aeration Basins

Most aeration controllers are not properly designed to address mixing-limited conditions. As a result, plants are either not providing enough air to properly mix their basins, or they are wasting energy and returning substantial amounts of oxygen to anaerobic or anoxic reactors. The VEMA controller automatically adjusts blowers and air valves based on current DO readings and airflow flow measurements. Short variations in the aeration intensity periodically produce higher levels of mixing energy to ensure adequate solids suspension in the mixing-limited environment, while precisely controlling DO levels in each reactor basin.

- **VEMA controller saves energy:** When a plant is underloaded, operating with control strategies such as ammonia based aeration control (ABAC) and simultaneous nitrification and denitrification (SNDN) may be difficult. Plants struggle to maintain the targeted DO setpoints, resulting in wasted energy. VEMA controller ensures DO targets are met to realize energy savings as intended.

- **VEMA maintains consistent effluent quality:** By detecting instances where aeration demand is not sufficient for complete mixing, the VEMA controller intermittently increases the aeration intensity to maintain solids in suspension. This ensures there are no “dead zones” for treatment, resulting in consistent high quality effluent.

- **VEMA optimizes nitrogen removal:** Excessive aeration and high oxygen concentrations inhibit denitrification in anoxic zones, resulting in poor nitrogen removal. The VEMA controller limits the amount of oxygen recirculated to these reactors, improving nutrient removal performance.

- **VEMA reduces chemical consumption:** Excessive aeration and high oxygen concentrations can turn anaerobic reactors to anoxic tanks. The VEMA controller limits the amount of oxygen, and/or nitrate, recirculated to these reactors, improving biological phosphorus removal performance and reducing chemical usage.

Backed by Sanitaire’s biological process expertise and supported by Xylem’s suite of premium products, OSCAR is committed to your process optimization. High quality treatment starts with precise aeration control. Let one of our process experts show you how OSCAR takes the guesswork out of CASPERON process control.