DOmaster^{TM} FAQs

Do you have a question about *DOmaster*^{TM} that hasn't been answered here? Please for further assistance.

How does DOmaster^{TM} *control dissolved oxygen concentration (DO)?*

DOmaster^{TM} is software that maintains constant DO in each part of the aeration basin, using readings of on-line DO and airflow meters to automatically match oxygen demand with oxygen supply in real time.

Why is maintaining constant DO important?

When DO increases above the optimum value, energy is wasted and the nitrate and phosphorus removal processes deteriorate. DO falling below the optimum value causes sludge settling and flocculation problems and deterioration of the nitrification process.

Why is the traditional DO control method rarely effective?

- Most DO control systems control blower output based on discharge pressure, even though the discharge pressure of a blower is affected more by water depth in an aeration basin, hydraulic flow, and ambient temperature than by blower airflow.
- In addition, most DO control systems use multiple PID (proportional-integral-derivative) control algorithms. PID algorithms were developed more than fifty years ago for control of processes described by linear equations. Neither activated sludge nor aerodynamic processes can be described by linear equations. This fact makes precise tuning of each of PID control loop very difficult, if not impossible. As a result, the performance of these control loops is usually poor.
- Poorly operated control loops cause system oscillation (valve and blower "hunting"), and frequent disruption of blower operation due to initiation of the surge protection control routine.
- In these types of systems, set points cannot be maintained precisely, and DO meter and actuator failures that drastically reduce reliability of plant operations cannot be detected.

Why is DOmaster^{TM} *so much more effective?*

DOmaster^{TM} has the following unique features that make it superior to the traditional DO method (described above):
- *DOmaster*^{TM} uses non-linear aerodynamic and activated sludge models instead of traditional PID (linear) control algorithms.
- Blower control is based on valve positions and actual airflow demand rather than on discharge pressure.
- Special pattern recognition algorithms provide early detection of problems with DO meters and actuators, at which point the software informs operators of the problem and automatically switches to "safe mode."

How is the DO set point selected?

The DO set point is usually selected by the operator, based on operating experience. Once selected, the set point should be reviewed daily, but in practice is rarely updated and, as a result, is not optimized. *OPTImaster^{TM}* from Ekster and Associates will automatically select and recommend a new set point every 24 hours.

What happens if one of the meters suddenly provides faulty readings?

DOmaster^{TM} detects the abnormality and alerts operators. It also automatically changes the control algorithm.

What if an actuator fails?

DOmaster^{TM} detects the abnormality and alerts operators.

What happens if the DO control system fails?

In the event of a system failure, the airflow set point will remain constant, mitigating short-term effects of the failure.

What is the payback period for DOmaster^{TM}?

The payback period is proportional to the variability of DO over 24 hours. If you send Ekster and Associates a record of your DO meter readings from one 24-hour period, we will forecast your energy savings and corresponding reduction in carbon emissions that can be achieved by DO optimization and automation in your plant.