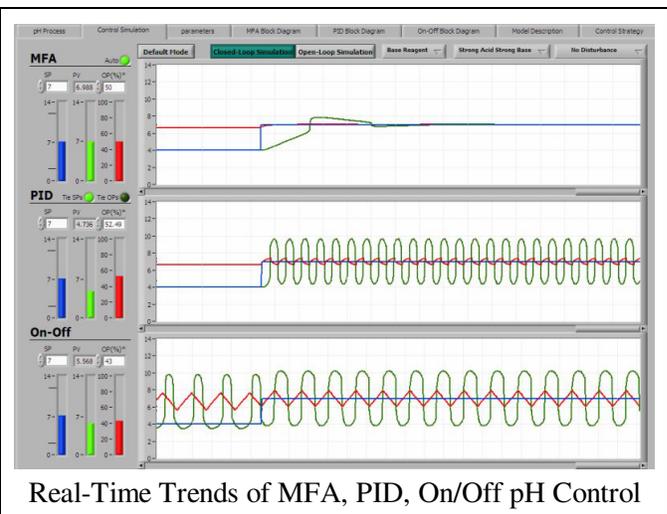
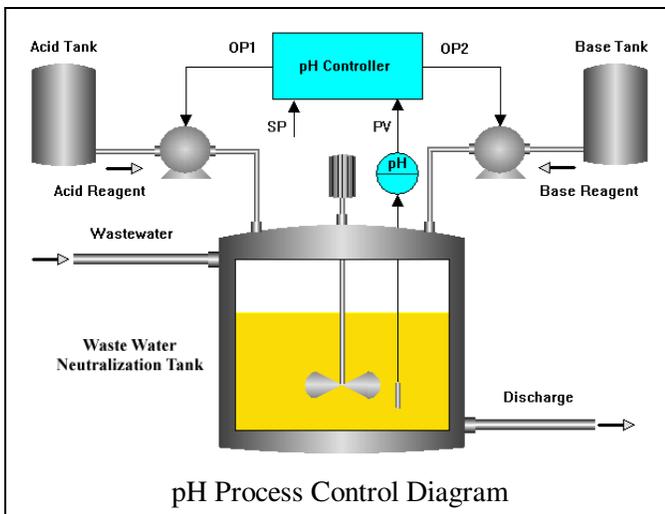


# Real-Time pH Process Modeling & Control Simulation Software

Problems	Solution and Benefits
pH control is extremely difficult. Most pH controllers are based on On-Off “Bang-Bang” control with poor results.	MFA, PID, and On-Off control simulations show the pH control performance differences.
pH process can be tricky and hard to understand.	pH process model makes it easy to understand.
A typical plant spends a lot of money to buy chemical reagent every month but has a tight capital budget.	Show Management the ROI to get the budget to improve pH control and achieve savings.



**pH Process:** Most process plants generate a wastewater effluent that must be neutralized prior to discharge or reuse. About 90% industrial wastewater pH processes are still controlled by On-Off control, resulting in chemical reagent wastes, equipment corrosion, and environmental pollution. Statistics show that a poorly controlled pH process can cost tens of thousands of dollars in chemical usage each month, not counting the penalties imposed by violating EPA or local discharge codes.

**pH Control:** A pH process is extremely nonlinear. The pH value versus the reagent flow has a logarithmic relationship. Away from neutrality, the process gain is relatively small. Near neutrality, where pH=7, the process gain can be a

few thousand times higher. It is impossible for a fixed controller like PID to control this process.

**pH Real-Time Model:** Before implementing a pH control system, it is wise to study and understand the pH process you have so that proper solutions, equipment, and software can be acquired and installed.

CyboSoft’s Real-Time pH Process Modeling and Control Simulation Software is a useful tool for such studies and includes: (1) pH process diagram, (2) a strong-acid-strong-base pH model, (3) a strong-acid-weak-base pH model, (4) a weak-acid-strong-base pH model, (5) a weak-acid-weak-base pH model, (6) MFA control simulation for the 4 pH processes using an MFA pH controller, (7) PID control simulation for the 4 pH processes, (8) On-Off control

simulation for the 4 pH processes, (9) graphical interface with control faceplates and real-time trends, (10) LabVIEW diagrams, and (11) pH process model description, MFA controllers used, and recommended control strategy.

**Solution:** You can test your pH controller using the pH process model. The control results can be compared with the MFA pH control results obtained in MFA control simulation. You may take the results, estimate the chemical reagent savings, and present the ROI to get the budget for the proper pH controller or control software to improve pH control and achieve all the benefits.

**MFA Control Products:** You may use: (1) CyboCon MFA Control Software, (2) CyboCon CE MFA Control Instrument, (3) MFA Control Toolset for LabVIEW Software, and (4) Embedded MFA controllers.