

Applying the Digital Twin to Chromatography Columns



Dynamic simulation with Mimic Simulation Software provides a high-performance solution for operator training and control system optimization. This Digital Twin technology delivers the complete environment for control system optimization and is an effective tool for teaching process and control engineers the control and operation of chromatography columns.

Chromatography Modeling

Solutions for chromatography columns include dynamic models of the following process areas:

- Feed tanks and pumps
- Separation/elution column
- Discharge tanks

Application Capabilities

- A combination of first-principles and empirical techniques ensuring dynamic, real-time mass and energy balances
- Ion-exchange or other physiochemical interaction models
- Dynamic, real-time individual component tracking with realistic composition profiles
- Realistic pH and conductivity values estimated from strong and weak acids and bases, in addition to buffering effect of conjugate salts in solution
- Flexible configuration as required to simulate all the typical phases of a chromatography operation including equilibration, loading, separation and elution

Mimic Simulation Software



Train operators on infrequent and dangerous process occurrences



Test control system enhancements



Transfer knowledge from seasoned to inexperienced operators

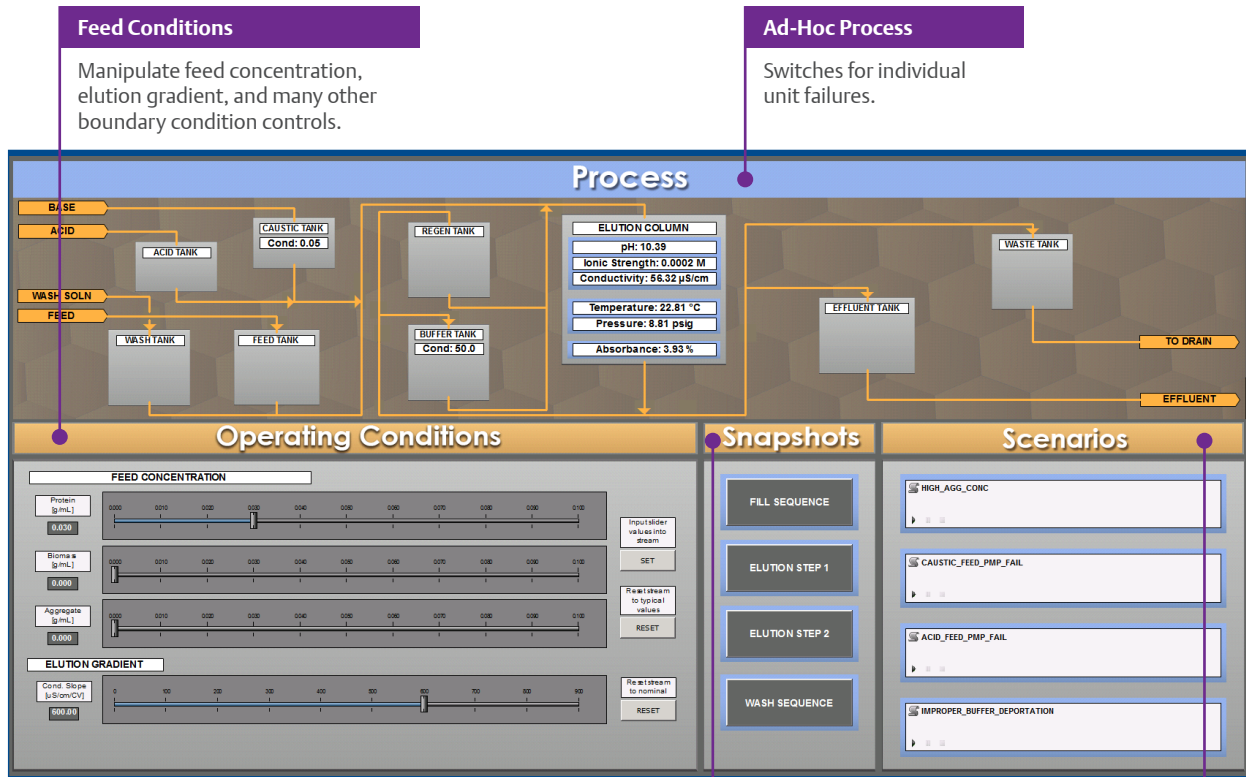


Increase overall plant safety

Instructor Station

Instructor controls in Mimic and instructor screens in Mimic Component Studio allow your training team to prepare for working with the control system and process. Any element in Mimic can be manipulated or controlled, and instructor screens provide

easy access in one location. Typical controls allow instructors to manipulate operating conditions, such as boundary conditions and compositions, introduce ad-hoc device failures, control scripted training scenarios, and restore snapshots to steady-state operations.



Process Snapshots

Control and restore full steady-state, cold, or other plant conditions.

Scripted Scenarios

Pre-engineered scenarios with dynamic representation of student scores.

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