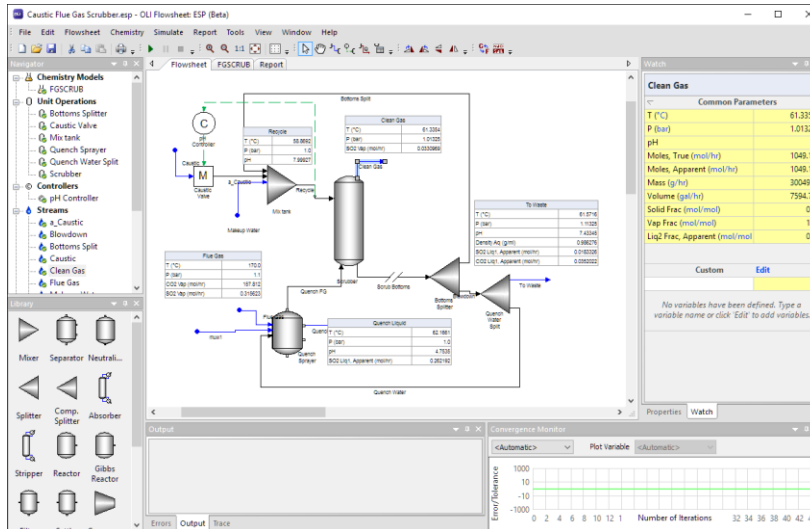


OLI Flowsheet: ESP is an electrolyte-based, steady-state process simulator. It performs energy-, mass-, and species-balance for industrial and research applications. The tool has thirty generalized units that can be configured to over one-hundred units and unit operations. It is a one-of-a-kind software, developed by electrolyte specialists to support fully electrolyte applications within a flowsheet environment. ESP is also the most complete flowsheet implementation of OLI's electrolyte thermodynamics technology.



Core Elements

The core elements of OLI Flowsheet: ESP are the ESP Blocks and the OLI Engine.

✓ The **ESP blocks** contain electrolyte-specific features for pH control, membrane purification, mass transfer limitation, and other important chemical engineering mechanisms.

✓ The **OLI Engine** predicts equilibrium states of multi-phase (gas-oil-water-solid-interface) systems.

ESP Blocks

The simulation blocks within ESP are optimized for electrolytes. The block calculations, which are varied, are designed to for efficient data input, review, and manipulation. Specialized blocks, such as membrane, crystallizer, and mass-transfer limited towers, provide the user with first-principle predictions for these separation technologies. A generalized list of ESP blocks are provided below.

Conventional	Multi-stage	Specialized	Control	Other
Mixers	Absorbers	Reactors	Feedback	Compressors
Splitters	Strippers	Neutralizer	Feedforward	Pumps
Separators	Distillation	Precipitator	Valve/manipulator	Energy Transfer
Heat Exchangers	LLE Extractor	Crystallizer	Sensitivity	Calculator
Filters		Saturator		Autoclave
Settlers		Dehydrator		
		Membrane		
		Electrodialysis		
		Electrolyzer		

OLI Engine

The OLI Engine is the product of a 45+ year applied research effort to predict the properties of multi-component (ions & molecules), multi-phase systems. Such a goal requires accurate prediction of activity and fugacity coefficients. Peer-reviewed, state-of-science theories that predict activities are the centerpiece of the OLI Engine. OLI Engine features include.

- 80 elements chemistry – expandable to new species
- Oxidation–reduction reactions including reaction limited states
- Rate-limiting kinetic reactions
- Hydrocarbon pseudocomponents

OLI Flowsheet: ESP

OLI Engine features (continued):

- Supercritical phases
- pH and alkalinity reconciliation
- Solid Phase editing
- Activity coefficient models
 - Strong Electrolyte (AQ) to 30 molal
 - Mixed Solvent electrolyte (MSE) to fused-salt and miscible liquid limit
- Equation of State range: -0 to 1500+ atm and -50°C to 90% of Critical T

Common Applications

ESP is used in a myriad of applications because of the chemistry breadth covered by the OLI Engine and because of the ESP block versatility. Therefore, ESP is used in water-purification & processing, oil and gas production, steam generation, power generation, and utility water. The list below are some example plant applications that are commonly modeled with ESP.

- | | |
|--|--|
| • Wet/dry flue gas scrubbing and oxidation | • Crude tower overhead desublimation |
| • Sour water stripping | • Glycol regeneration |
| • Autoclaves | • Chlor-alkali generation |
| • Claus plants | • Forward osmosis |
| • Benfield Process | • Potash processing |
| • Amine sweetening and regeneration | • Pond evaporation and lithium isolation |
| • Seawater desalination | • Urea production |
| • OTSG water purification and blowdown | • Multiple Effect evaporation |

Capabilities

- | | |
|--|---|
| ✓ Flowsheet simulation with speciation | Streams are carried on a true-species basis and all speciation is considered for the range of conditions |
| ✓ Comprehensive databank | The complete OLI databank has coverage for the electrolyte chemistry of 80 elements, and several thousand aqueous organics, hydrocarbons, and solid phases |
| ✓ Sensitivity Analysis (2017) | Scan the sensitivity of output variables on adjustable input parameters or species. |
| ✓ Controllers | Simple to complex controllers, nested recycles, and flow/component manipulate blocks are used to make converging on the steady-state solution more quickly. |
| ✓ Calculator (2017) | Interface to Excel for user-supplied calculations |
| ✓ Mass Transfer Limited tower | The user has the ability to set the overall transfer efficiency, individual species mass transfer coefficients, or utilize the list of four column and sixteen packing types. |

Included with OLI Flowsheet: ESP

OLI Studio: Stream Analyzer For in-depth chemistry studies of your electrolyte chemistry

