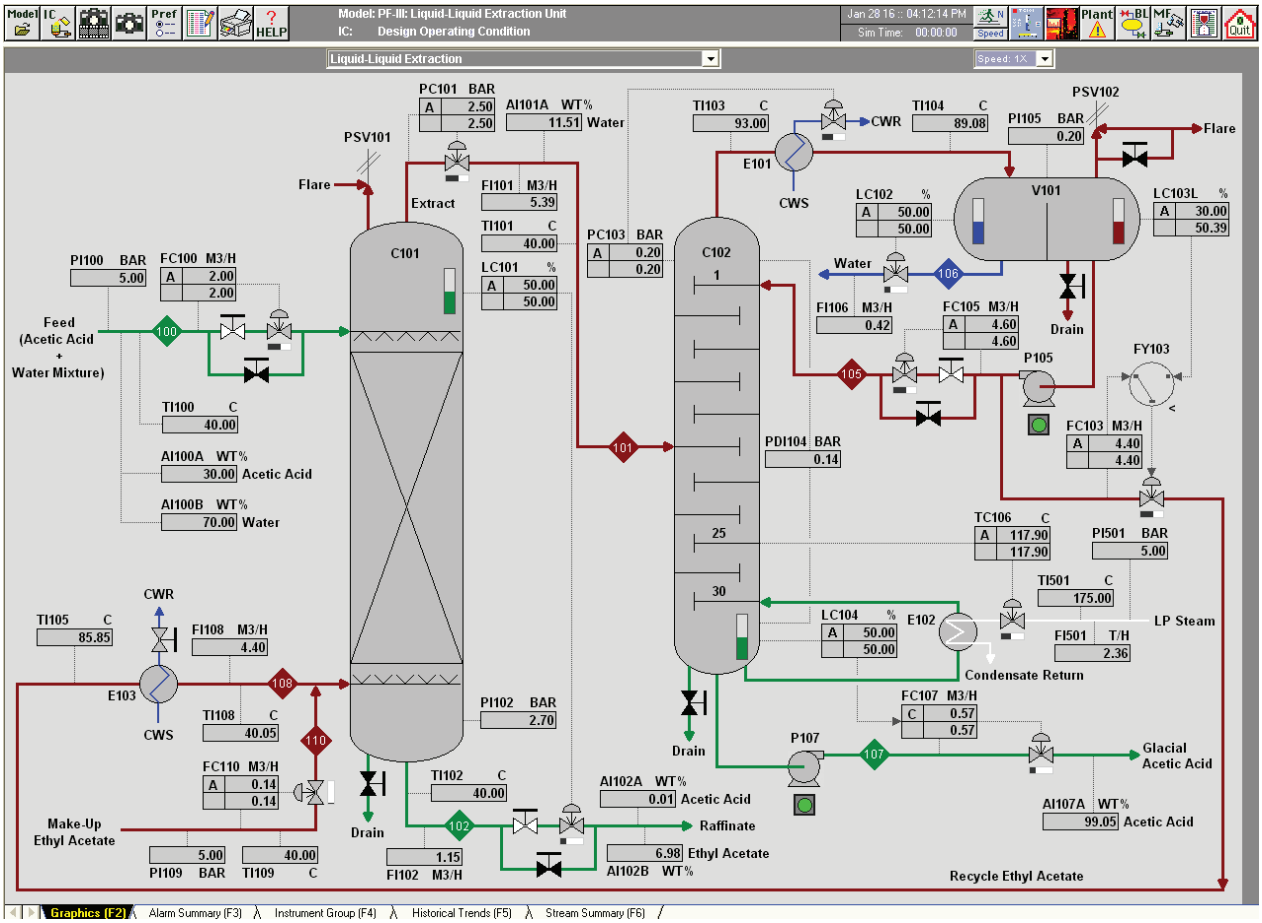
EnVision
e-Learning & Universal Simulation

Liquid – Liquid Extraction Simulation

GSE's Liquid-Liquid Extraction EnVision simulation is a rigorous and high-fidelity mathematical process model that provides a realistic dynamic response of a liquid-liquid extraction system with specific simulation exercises.



- Simulation comes with a Learning Management System (LMS) called SimAdmin that allows an instructor to register trainees and monitor their performance
- Simulation is available as Standalone (Single or Dual Monitor) and Instructor-Trainee versions

GSE Solutions
www.gses.com/EnVision

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Process Overview:

This simulation model will help in understanding the principles of a liquid-liquid extraction system, using the production of glacial acetic acid as an example. The simulation model consists of an extraction column and a dehydration column. The main feed to the extraction column, a binary liquid mixture of acetic acid and water, enters the column at the top as a continuous phase. Ethyl acetate is used as a solvent to separate acetic acid from the acetic acid-water mixture and enters the column at the bottom as a dispersed phase. In the extraction process, acetic acid is preferentially transferred from the feed to the solvent ethyl acetate as compared to water. The solvent rich phase, called extract, exits from the top of the extraction column, while the water rich phase, called raffinate, exits from the bottom of the extraction column.

The acetic acid in the extract is separated from the solvent ethyl acetate in a dehydration column. The majority of the separated solvent is recycled back to the extraction column for reuse. The acetic acid, thus obtained as product is of 99% purity and is called glacial acetic acid.

Major Operations for Trainee Practice:

- Startup and Shutdown Operations
- Unit Control Strategies and Operations
- Troubleshooting Loss in Feed, Cooling Water and LP Steam Malfunctions
- Troubleshooting Instrument and Control Valve Malfunctions
- Malfunction Recovery Actions

Simulation Features:

- Effect of changes in Extraction Column Feed Flow
- Effect of changes in Extraction Column Feed Composition
- Effect of changes in Extraction Column Feed Temperature
- Effect of changes in Cooling Water Temperature

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DS.ENV.54.VA 07/24

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