EnVision
e-Learning & Universal Simulation

HF Alkylation Unit

A self-paced MultiMedia based Tutorial/CBT and real-time dynamic simulation of an HF Alkylation Unit.

Tutorial/CBT:

This interactive tutorial provides an Overview, Fundamental Principles, and Control and Operating Principles for an HF Alkylation Unit using Voice, Video, Animation and Graphics.

Overview
- Introduction
- Importance of HF Alkylation Unit
- Key Reactions
- Process Overview
- Fractionation Schemes

Alkylation Reactions
- Key Chemical Reactions
- Detailed Reactions
- Additional Reactions

HF Alkylation Unit Components
- Feed System
- HF Alkylation Reactor
- Acid Regeneration
- Acid Dump System
- Fractionation
- Product Treating

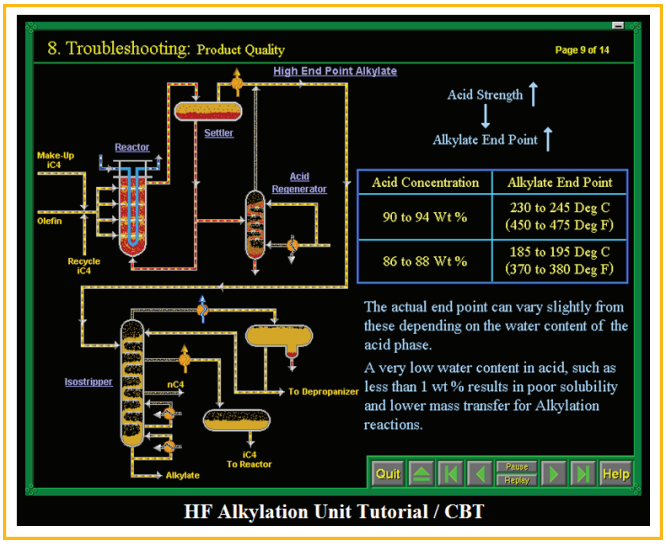
Key Controlled and Operating Variables
- Feed Flow Control
- Feed Drying
- Isobutane toOlefin Ratio
- Acid Strength
- Water in Acid Phase
- Reactor Temperature
- Contact Time
- Acid to Hydrocarbon Ratio
- Alkylate Specifications

Safety Systems
- Safety System
- Water Spray Systems
- Acid Inventory
- Relief and Emergency Dump System
- Metallurgy and Corrosion Issues

Startup Operations
- Pre-Startup Check
- Hydrocarbon Circulation
- Acid Addition
- Olefin Addition

Shutdown Operations
- Introduction
- Feed and Acid Regenerator
- Acid and Hydrocarbon Removal
- Isostripper, Depropanizer and HF Stripper Shutdown

Troubleshooting
- Loss of Feed
- High Water Content in Acid
- Low Acid Concentration
- High Acid Consumption
- High Acid Carryover to Fractionation
- Reactor Acid Runaway
- Product Quality
- HF Acid Leak in Reactor-Acid Settler
- Loss of Cooling Water



HF Alkylation Unit Tutorial / CBT

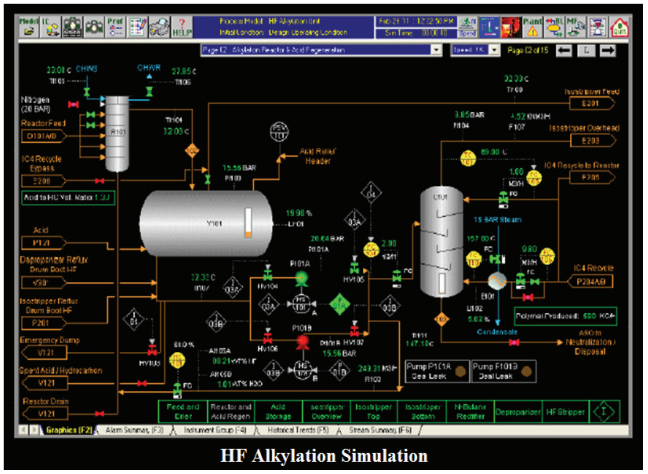
- Tutorial has a built-in Quiz and comes with a Learning Management System (LMS) called TutAdmin. The LMS allows an instructor to register trainees and monitor their performance and Quiz scores
- Tutorial is available as a Standalone or Web based application
- Available in English, Chinese, Danish, Dutch, French, German, Spanish and Swedish

GSE Solutions
www.gses.com/EnVision

HF Alkylation Unit

Simulation

GSE's EnVision simulation is a real-time dynamic process simulation program used for Operator Training. It is based upon a rigorous and High-Fidelity mathematical process model to provide a realistic dynamic response of a process unit.


HF Alkylation Simulation

The Simulator allows a Trainee to Practice:

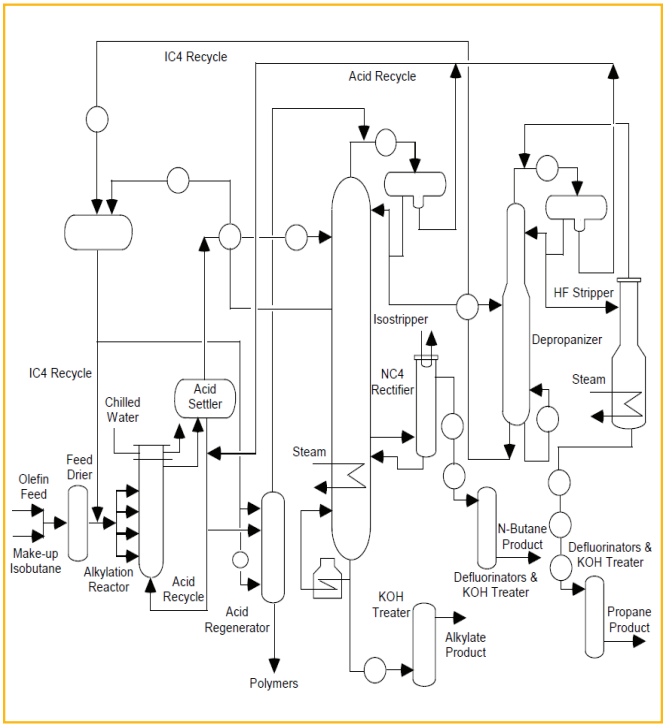
- Startup and Shutdown Operations
- Normal Operations
- Emergency Shutdown Operation
- Control Exercises
- Troubleshoot and practice recovery from Equipment, Instrument, and Control Valve Malfunctions

Major Equipment:

- Feed Driers
- Alkylation Reactor
- Acid/Hydrocarbon Settler
- Acid Regenerator
- Isostripper
- N-Butane Rectifier
- Depropanizer
- HF Stripper
- Defluorinators
- KOH Treaters

Key Operating Variables:

- Olefin Feed: 28.10 M3/H (4.2 MBPD)
- Make-up Isobutane: 7.05 M3/H (1.1 MBPD)
- Isobutane Recycle: 158.00 M3/H (24 MBPD)
- Alkylation Reactor
  - Temperature: 32.1 C (89.8 F)
  - IC4 to Olefin Ratio: 10.0
  - Acid to Hydrocarbon Ratio: 1.30
  - Acid Strength: 89.2 Weight Percent
  - Reactor Pressure: 15.60 BAR (226 PSIG)
- Acid Regenerator Feed: 2.0 M3/H (0.3 MBPD)
- Isostripper Pressure: 9.90 BAR (144 PSIG)
- Alkylate Product: 26 M3/H (3.9 MBPD)
- Depropanizer Feed: 10.2 M3/H (1.5 MBPD)
- Depropanizer Pressure: 18 BAR (261 PSIG)
- Depop Bottom Recycle: 8.1 M3/H (1.2 MBPD) 4.7 M3/H (0.7 MBPD) 1.9 M3/H (0.3 MBPD)
- HF Stripper Feed:
- Propane Product:



- 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

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