DarbyTech
Training Equipment Inc.

Fluidized Catalytic Cracker Unit Trainer

Topics:

- FCCU process dynamics
- Solid particle bed fluidization
- Process control

Sub Topic:

- FCCU catalyst fluidization
- Catalyst flow & reactor operation

Key Objectives:

Students shall learn:

- Solid particle bed fluidization
- Continuous catalyst flow reactor operation
- Equipment start-up and operating procedures
- Process control concepts for manual and automatic operation
- Impact of varying operating conditions of catalyst fluidization and flow
- Control experience on a Distributed Control System (DCS) or PLC

"the plant is no place to practice!"

JBA Engineering

DARBYTECH
TRAINING EQUIPMENT INC.

Fluidized Catalytic Cracker Unit Trainer

Description:

Fluidized Catalytic Cracker Units are common unit operations in oil refineries.
The FCCU Trainer is a reduced scale plant that mimics bed fluidization, catalyst circulation and regeneration.

- Note that since FCCU operating conditions include high temperatures and/or pressures, no substantial chemical reactions take place in this unit. It is designed to mimic the process at conditions of temperature and pressure lower than actual.
- Working fluids are air, CO_2 and water.
- Visualization of the catalyst material uses small diameter spherical glass beads and a coloured desiccant to mimic the catalyst bed. Catalyst degradation is mimicked by a colour change of the desiccant beads in the reactor and is reverses during regeneration.
- CO_2 is used as a tracer compound to show the separation of flow in the reactor and regeneration sections.
- The process has instrumentation to provide for reactant flow rate control, product gas analysis, catalyst level control, temperature indication and control and differential pressure indication.
- The entire trainer is controlled from a DCS computer interface with purpose designed software and control configuration.
- This gives the student the opportunity to gain operating experience focusing on both the process and on control strategy.

Equipment Specification Highlights:

Much of the process is fabricated of industrial glass, with custom fabricated SS sections

- Continuous up-flow reactor (glass)
- Glass disengaging vessels
- Glass piping
- Stainless steel vessel flanges and custom fittings (e.g. vessel bottoms and transition pieces)
- Flow measurement of reactant streams (CO_2 and air)
- Analysis of CO_2 in product stream
- Thermocouple temperature measurement
- Control cabinet with:
  - o Power supply, switching, transformer and controls
  - o DCS or PLC with I/O cards
- Pneumatic operated control valves
- Dedicated computer control station
- Purpose-programmed software configuration and computer/operator interface
- Time to reach steady state after a reasonable step change - less than 20 minutes
- Complete unit mounted on a stainless steel frame
- Approximate overall dimensions - 3300x920x2650 mm high (130" wide x 36" deep x 104" high)
- Optional self-contained with dedicated air compressor, receiver and drier is available

Utilities:

- Electrical power (other world voltages - please specify)
  - o Single phase 120VAC or 240 VAC
  - o 208/240 VAC 3 phase
- Instrument Air

Note: A complete teaching system is included with student exercises, instructors' manual, technical and maintenance manuals.

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