

FLUIDIZED CATALYTIC CRACKING UNIT

Overview:

Cracking is the process of breaking down large oil molecules into smaller, lower boiling molecules to produce gasoline, fuel oil, and other hydrocarbons. Catalytic cracking, first explored by Houdry in 1927, offers advantages over thermal cracking by yielding more stable products, higher-octane gasoline, and less gas output.

Fluidized Catalytic Cracking (FCC):

Developed in the 1940s, **Fluidized Catalytic Cracking** uses finely powdered catalyst particles that behave like a fluid when aerated. Incoming oil vaporizes on contact with the hot catalyst in the reactor, where cracking begins. After the reaction, the catalyst moves to the regenerator, forming a continuous cycle.

Plant Function:

The **FCC Unit** catalytically cracks vacuum gas oil from the Vacuum Distillation Unit (VDU) into valuable hydrocarbons. The cracking section includes the reactor and regenerator, connected by a riser, standpipe, and stripper, creating a circulation circuit for the catalyst.

- **Feed and Catalyst Flow:** Combined feed enters the riser, where it vaporizes and heats upon contact with the catalyst. The vapor-catalyst mixture rises into the reactor, where cracking continues.
- **Coke Removal:** The spent catalyst, carrying coke deposits, flows from the reactor to the regenerator, where air burns off the coke, raising the catalyst temperature.
- **Gas Separation:** Cyclones separate the catalyst from hydrocarbon vapors in the reactor and from flue gases in the regenerator. Flue gases, a mix of CO and CO₂, produce steam in the CO boiler before venting.

This cycle ensures efficient cracking with continuous heat transfer and catalyst regeneration.

FCCU-INSTITUTES

(Reactor Regenerator, Regen Reactor Temp, Reactor Section, Regenerator)

