CATALYTIC REACTOR

OVERVIEW:

The Catalytic Reformer Plant upgrades low-octane feedstocks into high-octane gasoline, essential for producing fuel with better combustion efficiency. A by-product of this process is hydrogen, which is used in desulfurizing the feedstock to prevent catalytic poisoning.

Key Processes in Catalytic Reforming:

Desulfurization:

- Feedstock undergoes desulfurization using hydrogen produced in the reforming reactions to reduce sulphur content to extremely low levels, preventing catalyst damage.
- This is a critical step for maintaining catalyst integrity and efficient reforming.

Reforming Section:

- Reforming involves cracking and isomerization reactions. Straight-run gasoline and light naphtha's, typically with low octane numbers, are transformed in the reforming unit.
- Isomerization converts straight-chain compounds to branched chains, significantly increasing the octane rating of the fuel.

Plant Setup and Equipment:

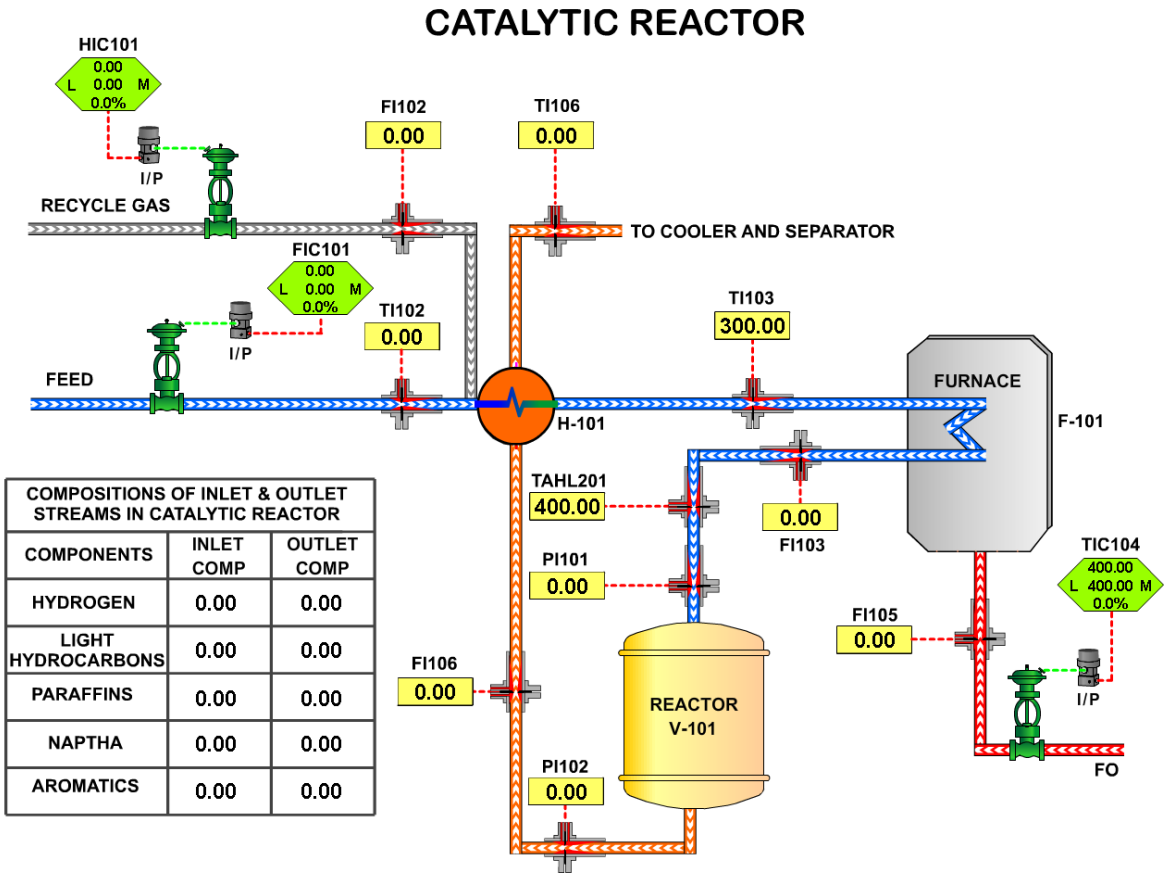
The reformer plant includes multiple sections, with the primary reaction units as follows:

- Reactor: Where the actual reforming process takes place, converting hydrocarbons to higher-octane fuel.
- Furnace: Supplies the necessary heat for the reforming reactions.
- Feed Effluent Heat Exchanger: Recovers heat between feed and product flows.

Although the plant contains three sets of these units, the simulator focuses on one reactor, furnace, and heat exchanger set to demonstrate the reforming process.

Simulator Operation

- **Feed Flow Simulation**: Feed flow in the simulator is controlled by adjusting the feed valve and recycle gas valve, with no need to simulate compressor or feed pump characteristics.
- **Adjustable Feed Composition**: Feed and recycle gas compositions can be altered from the instructor console for training and testing purposes.
- **Constant Reactor Pressure**: The reactor operates at a fixed pressure of 31 Kg/cm² G in the simulation.



COMPOSITIONS OF INLET & OUTLET STREAMS IN CATALYTIC REACTOR		
COMPONENTS	INLET COMP	OUTLET COMP
HYDROGEN	0.00	0.00
LIGHT HYDROCARBONS	0.00	0.00
PARAFFINS	0.00	0.00
NAPTHA	0.00	0.00
AROMATICS	0.00	0.00