PRESENTATION ON

FLUID CATALYTIC CRACKING

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Fluid catalytic cracking is a catalytic conversion process for converting heavy gas oil.

The fluid catalytic cracking is a low pressure intermediate to high temperature process.

This process can be achieved by two processing objective.

1 – Maximization of middle distillates.

2 – Maximization of LPG and gasoline.

TECHNOLOGICAL ASPECTS

FEEDSTOCK

Vacuum gas oil in the boiling range of 350-550 deg. C is used in a FCC.

REACTIONS

Catalytic cracking reaction occurs with the formation of carbonium ion.Reactivity order of carbonium ion –

Tertiary>secondary>primary>ethyl>methy

Catalyst

Fine powdered of range 10-40 micron (amorphous and zeolite) is used.

MODELS USED FOR FCC

1 – ESSO model

2 – Kellog otrthoflow model

3–Kellog orthoflow model F converter with two stage regeneration

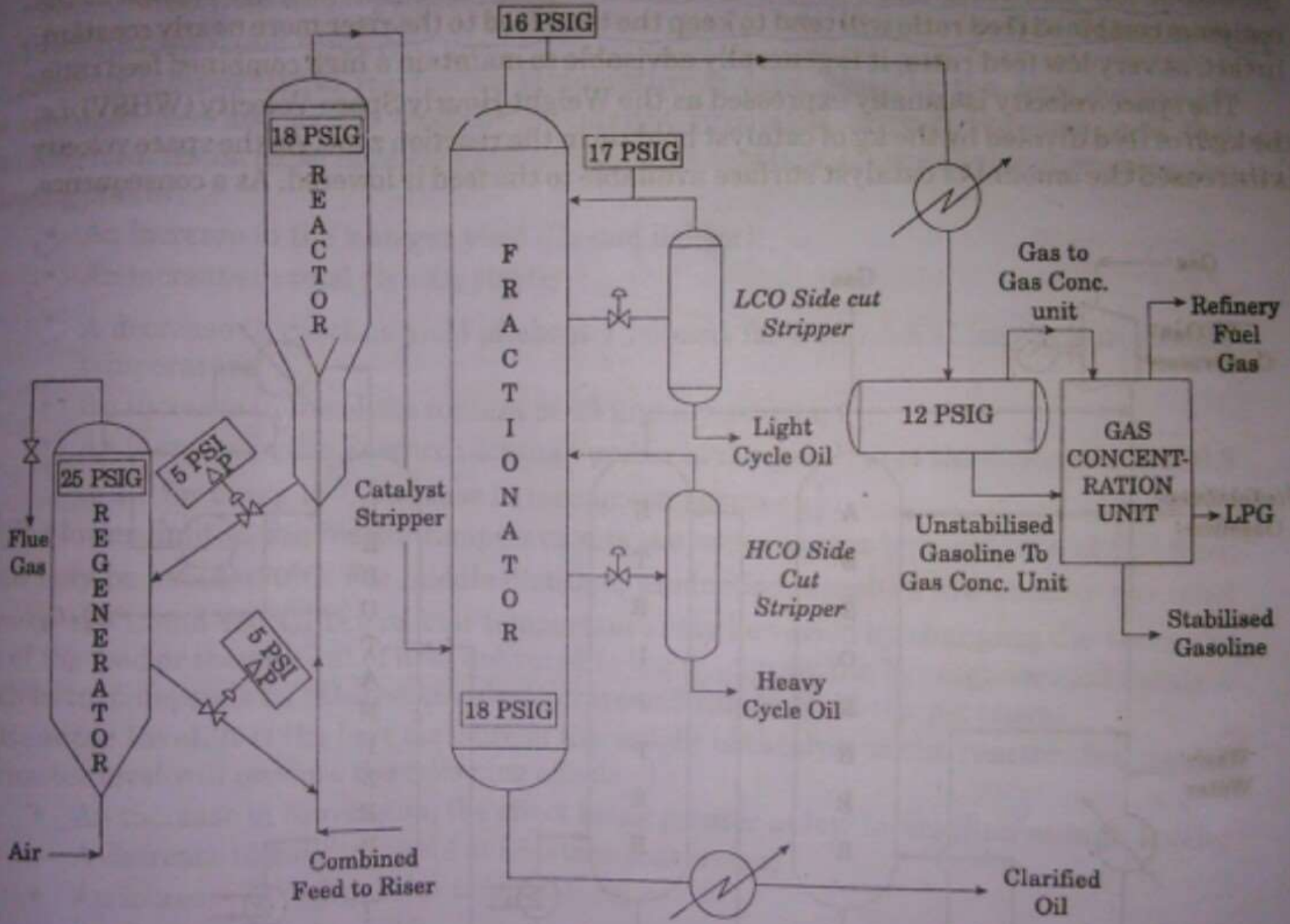

Fig. 8.4 Fluid Catatytic cracking process

PROCESS DISCRIPTION

The fresh feed preheated in a heat exchanger about 390 deg. C in a fire heater.Hot regenerated catalyst mixer with combined feed stream at the bottom of the riser.

The hydrocarbon are vapourized and also begin to crack.The catalyst and vapour rises as dilute phase to reactor.

Catalytic cracking of hydrocarbon produce which is deposited on the catalayst.This spent flow to the stripper where stream remove hydrocarbon vapour from interstitial void and spent catalyst flow to the regenerator.

The catalyst is continuously regenerated in the regenerator by combustion of coke with a steam of air.The heat produced by combustion of coke supply the heat necessary for balancing the heat required to operate the unit.

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The hot regenerated catalyst flow downward though the regenerated catalyst standpipe to the reactor riser to complete the cycle.

Hydrocarbon leaving the reactor at temperature between 470 -540 deg. C are send to the main fractionator.

The function of the fractionator is to cool and condense the incoming hydrocarbon vapour and to separate the product. The product withdrawn the main fractionator are gas and naphtha light and heavy cycle oil and clearified oil.

TYPICAL OPERATING CONDITION

REACTOR TEMPERATURE	470-540
REGENERATOR TEMPERATURE	590-610
REACTOR PRESSURE(KPa)	232
REGENERATOR PRESSURE(KPa)	274
FRACTIONATOR PRESSURE(KPa)	225

TYPICAL YIELD PATTERN

PRODUCT	MAXIMUM GASOLINE PRODUCTION(%)	MAXIMUM CYCLE OIL PRODUCTION(%)	MAXIMUM CYCLE OIL (MATHURA REFINERY)%
H2S (C1 – C4)	22.9	17.0	0.9 13.5
C_5 + GASOLINE	45.8	31.1	22.3
LIGHT CYCLE OIL HEAVY CYCLE OIL	15.8	38.0	52.1
CLARIFIED OIL	7.5	7.5	5.4
COKE	8.0	6.4	5.8

Thanks