Reactive Adsorption Process (INDAdept) for Deep Desulfurization of Diesel (INDAdeptD) & Gasoline (INDAdeptG) Streams

**Background**

A novel process based on proprietary adsorbent for reducing refractory sulfur from diesel (INDAdeptD) and total sulfur from cracked gasoline (INDAdeptG) for production of low sulfur fuels meeting Euro-V specification. Hydrogen consumption is significantly low, since it is consumed only for saturation of olefinic bond generated by cleavage of the sulfur from the sulfur compounds.

**Process Description**

Process comprises two number of fixed bed reactors operated in swing mode of adsorption & regeneration. After reaching the breakthrough point, the adsorbent is regenerated with lean air by oxidation of adsorbed sulfur & coke followed by activation with hydrogen.

**INDAdeptD**

The process is particularly suitable as a finishing step after DHDS/DHDT for deep desulfurization of refractory sulfur from the diesel. During adsorption, hydrodesulfurized diesel containing refractory sulfur of 350 to 500 ppm along with hydrogen is contacted with the proprietary adsorbent in a fixed bed reactor at 300 to 400°C & 15 to 30 bar.

The existing DHDT unit can be operated at lower severity, just sufficient to meet the Cetane requirement, and further sulfur reduction can be achieved by employing INDAdeptD process. This will result in substantial saving (20-40%) of precious hydrogen.

**INDAdeptG**

The INDAdeptG process for gasoline desulphurization is similar to INDAdeptD except changes in operating range of parameters such as pressure, temperature, H2/HC ratio etc. The process is capable of processing full range cracked naphtha in single step. The process consumes lower hydrogen (0.15 to 0.25 wt% of feed) with minimal octane loss of 1 to 2 units.
Salient Features

- Low severity operation
- Reduces sulfur content < 10 ppm
- Uses low cost adsorbent
- Saves 20-40% overall hydrogen consumption
- Only 1-2 unit loss of octane value for gasoline desulphurization

Commercialization

Demonstration unit of 35000 Metric Tons per annum is under active consideration at Guwahati Refinery for reduction of sulfur content in Heavy Indmax gasoline.

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