HDS -55 UNIT PROCESS DESCRIPTION

This unit is comprised of 4 isothermal trickle bed reactors running in parallel. Liquid feed material may be loaded into 4 separate feed tanks. Tuthill circulation pumps are employed to ensure feed homogeneity. The feed tanks are well insulated and are kept under a positive pressure of 10 psig. In addition the Tuthill pumps are used to charge the Ruska pumps. The feed is then introduced into the reactor system with the aid of the high precision Ruska pumps. Hydrogen is fed into the reactors via high pressure Tescom gas regulators. The gas flow is controlled by Brooks mass flow meters. The gas and liquid is co currently fed in the reactor system. The flow pattern in the reactor may be described as down flow. The reactor exit pressure is regulated by Mighty Mite pressure control valves.

The gas stream is separated from the liquid stream in the low pressure stripper/ separator, which is run at 27 psig. Nitrogen is introduced into the stripper at a rate of 0,6 scf/h (or 2250 SCFB) in order to ensure the proper separation of Hydrogen Sulphide and Ammonia from the liquid product. The off gas from the low pressure separator proceeds to a Sodium Hydroxide scrubber whereas the liquid product enters the automatic sample collection system. The system characteristics and boundary conditions are adequately described in the figure below:



Process flow diagram for AU-55

Reactor loading

It is possible to load between 10 - 70 ml of catalyst into the reactor. We would normally load 20 ml of catalyst into each reactor, at a catalyst to diluent ratio of 1:4. 20 mesh Silicon Carbide is used as the catalyst diluent. The diluent is required in order to ensure the maintenance of isothermal conditions in the reactor. In order to get around problems associated with axial dispersion and poor catalyst wetting are reactors typically have a L/D of 41. In addition the top distributor is relatively long thereby allowing adequate time for liquid and gas redistribution through the reactor bed.

The dense loading catalyst density is taken to be x g/ml as per client specification. The reactors are loaded on a per volume basis after having weighed out the correct amount of catalyst for each system.