

II. EQUIPMENT AND MATERIALS

Reactor 5S was used for the runs which are the subject of this report. This vessel, which has been described previously,³ was 12 inches by 30 feet and contained three 2-inch cooling tubes joined together at the ends by spherical headers. The gas inlet at the bottom was equipped with a sparger to promote uniform distribution.

¹HRI Run 19-6

²This corresponded to about 7,300 BPD of total liquid product basis Brownsville design feed rate of 9,488 MCFH of H₂+CO.

³TDC-802-50-P pages 2 and 20.

Both new and spent ammonia-synthesis catalysts were used as base stocks for preparing the hydrocarbon synthesis catalysts. Spent ammonia catalyst was used in Run 59; new catalysts were used in the other runs.

In all cases the original catalysts were the fused iron, alumina, silica, potassia type prepared by Consolidated Mining and Smelting Company. The material as received at Montebello Laboratory was in lumps approximately $\frac{1}{4}$ -inch in diameter. It was ground in a Braun Chipmunk ore-sample crusher to pass a 14-mesh sieve.

In Run 58 and 59 the ground and screened material was used without further treatment except for reduction with hydrogen. For Runs 60, 61, and 62, potassium carbonate solution was added to the catalyst in the amount of 3.5 pounds of K_2CO_3 for 1000 pounds of dry catalyst. The mixture was then dried in a heated concrete mixer and reduced with hydrogen.

The usual procedure was to charge 2500 pounds of unreduced catalyst to the reactor and reduce it by circulating preheated cylinder hydrogen at 200 psi and 700 to 800°F. The makeup catalyst was reduced in a similar manner in a separate smaller vessel described in a previous report.¹

The synthesis feed gas was obtained by using the Texaco Partial Oxidation Process with natural gas and oxygen in a 2-cubic-foot generator. A water wash tower, described in a previous report², was used during all runs to remove traces of carbon and to cool the feed gas to facilitate measurement.

¹TDC-802-32-P

²TDC-802-33-P