

B7-19

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
OFFICE OF SYNTHETIC LIQUID FUEL
LOUISIANA, MISSOURI.

From Dr. Pier's File

T - 431

High Pressure Experiments
Ludwigshafen, 558

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Jan. 7, 1948

PRINCIPAL DATA ON THE FOAMING PROCESS FOR THE HYDRO-CARBON SYNTHESIS

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February 27, 1943, MI/K1

Process:

The gas is forced into a sump filled with paraffin produced in the reaction and containing colloidal iron (a filter plate is used with a pore width of 0.15 mm.)

Heat removal:

The sump is cooled by making the contents circulate through a relatively small outside cooler (heat transfer from liquid to liquid). Permissible heat rise 10°C. One sump circuit in about 3 minutes.

Reactor Construction: An empty vertical cylinder 8 mm high which contains in the bottom part a number of foaming plates (of granular quartz, held together by glass). A small vessel, in which the sump is degased, adjoins the reactor.

Catalysts:

Iron from iron carbonyl (or else obtained by precipitation) ground in oil to a particle size of 2 μ . 2 percent alkali (borax) added. 300 - 350 kg Fe/cbm of sump.

Synthesis gas:

CO : H₂ = 5 : 4

Pressure: 20 atm.

Temperature: 250°C

Production: 0.30 - 0.35; if the gas is recirculated, with a CO₂ scrubber 0.40 - 0.45.

Products: Gasol 8 - 10 percent
 Gasoline, - 200°C 45 "
 Middle oil, 200 - 350°C 30 "
 Paraffin, 350°C 15 "
 Gasification, abt. 5 "

Properties of products: Refined gasoline, O.N. 62
 Refined gasoline, with 0.09 percent Pb, O.N. 76
 Middle oil (Diesel oil) C.N. 70
 Olefines: gasol 75 percent
 gasoline 65 - 70 "
 middle oil 50 "

Yields: 175 g liquid and solid products per cbm utilized gas, 160 g liquid and solid products per ncbm gas (90% convers.).

Applications: 65 percent of the gasoline can be converted to alcohols by the oxo process (lacquer section). 40 - 50 percent of the middle oil gives sulfonates with H₂SO₄ (detergents).

Experiments to date: 1.5 cbm reactors with seven months operation. Longest continuous operations - three months. No more difficulties are being experienced.

Industrial units; Reactors 8 m high, 2 m diam., 30 cbm capacity, or else reactors 8 m high, 2.5 m diameter, cap. 45 cbm.

New experimental reactor: 8 m high, diam. 1.50 m, cap. 13.5 cbm, for 5 te/day.

/s/ Michael