

Supplemental Report on Ruhrchemie A.-G., Sterkrade-Holten, Ruhr.

by

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OXO PROCESS (pages 17-19; Figures VI and VII)

Some additional information on the Oxo-Process, as developed at Ruhrchemie, has been obtained from Dr. Landgraff, manager of the Oxo Plant.

The economic estimate attached as Table II, as well as the design data for the commercial unit were calculated from a pilot unit in which the reactor size was 5 meters length and 135 mm. internal diameter. The design of this pilot unit was ultimately projected to the commercial plant.

The pilot unit had a charge capacity of 50 kg. of olefin mixture (i.e. 1/10 commercial size) and operated batchwise.

The Oxo-stage charge gas was water gas $\text{CO:H}_2 = 1:1.1$ to 1.2 and was recycled until the composition reached $\text{CO:H}_2 = 1:2$, with 15% of CO_2 and 15% of N_2 . The gas was then vented.

There are also attached two schematic flow sheets of the process, Figures VI and VII.

TABLE II

ESTIMATE OF THE WORKING COSTS FOR 12,000 TONS PER YEAR OF FATTY ALCOHOLS

(Based on a supply of 12,000 tons per year of olefin from the Ruhrchemie, Sterkrade - Holten).

<u>Material Input:</u>	RM.	RM.	RM.
12,000 T. olefin at 0.40 RM/Kg.	4,800,000.		
6,000,000 Nm ³ watergas ³ 10 atm. at 0.04 RM/Nm ³	240,000.		
3,000,000 Nm ³ hydrogen 10 atm. at 0.075 RM/Nm ³	<u>225,000.</u>		5,265,000.
<u>Operating Costs:</u>			
Operating wages & salaries incl. social security tax (150 men x 8 h. x 365 days x 1.10 RM)		481,800.	
<u>Energy:</u>			
<u>Steam.</u>			
78,000 T/Y, 80 atm. at 4.00 RM/T.	312,000.		
97,000 T/Y, 18 atm. at 3.50 RM/T.	339,500.		
100,000 T/Y, 2.5 atm. at 2.55 RM/T (Vacuum and heating)	<u>225,000.</u>	<u>906,500.</u>	
<u>Electricity:</u>			
10,160,000 KWH at 0.03 RM/KWH (gas compressors, pumps)		304,800.	
<u>Water:</u>			
1,344,000 m ³ at 0.075 RM/m ³		100,800.	
<u>Accessory Material:</u>			
Catalyst cost.		<u>72,000.</u>	
		<u>1,865,900.</u>	