

XIX. POLYMERISATION OF C₆ AND C₇
OLEFINES.

The information on this process was obtained by plant inspection and interrogation of Dr. Gericks, the foreman in charge of the plant.

The process consists of the polymerisation of C₆ and C₇ olefines to C₁₂ and C₁₄ olefines which were used in the alkylation of phenol in the course of the manufacturing process for a detergent. This part of the synthesis was carried out at Höchst and only the C₁₂, C₁₄ polymers were prepared at Leuna.

The feed stock was made by dehydration of the alcohols boiling in the iso-hexyl and iso-heptyl alcohol range and obtained in the isobutyl alcohol synthesis. The olefine fraction of maximum boiling point of 203°F was used as feed stock.

Olefine and sulphuric acid (85%) were mixed at a rate of 105 gals. of olefine to 663 gals. of acid per hour. The mixture was preheated in a 2½" diameter lead coil (steam heating of a water bath) to about 120°F and introduced into a lead-lined tower of 3 ft. diameter and about 80 ft. height packed with iron Raschig rings. The mixture passed from the bottom of the tower into a settler from where it was recycled. Circulation was continued until a hydrocarbon sample withdrawn from the settler indicated that the desired polymerisation had taken place as shown by the results of a laboratory fractional distillation. The product was then caustic washed, water washed and distilled. The yield of desired polymer, boiling between 324 and 446°F, amounted to 50% by wt. of the olefine feed. The distillation range of the total reaction product and its utilisation are given as follows:

<u>% by wt. of</u> <u>feed stock</u>	<u>Boiling Range</u> <u>°F</u>	<u>Utilisation</u>
5 - 10	140 - 203	Recycled
5 - 10	203 - 324	Blended with heavy polymer.
50	324 - 446	Sp.g. product at 20°C = 0.730
20 - 30	Above 446	Heavy polymer to hydrogenation plant.

The design capacity of the plant was 440,000 lbs. of product/month but the actual output of C₁₂, C₁₄ polymers was only 66,000 - 88,000 lbs/month. Samples of the olefine feed stock and polymers product were obtained for detailed examination.