

SINCLAIR REFINING COMPANY

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Note: Concerning a conference with Hoesch-Benzin G.m.b.H. Dortmund
October 10, 1942

This conference had the purpose of discussing the synthesis yields obtained with the contacts which had been delivered in August and September and had been put into operation. In accordance with a request made by Hoesch they had been reduced in the catalyst factory at a temperature of 5° above the normal.

Dr. Gross begins his report by discussing the tests made with the kieselgur samples we had sent, pursuant to the method of making H- and CO- absorption curves, which is customary with Hoesch. The samples were either tested as delivered or they were examined after being pretreated with hydrogen at 400° for four hours. Furthermore, catalysts were prepared with them, and tested, too. Pretreated gurs showed better CO-absorption yields. However, it was found that any reactions between CO and the iron reduced in the course of the hydrogen pretreatment, had been disregarded, although such reactions occur in some cases. We agreed that the tests would be repeated with gurs heated in an oxidizing atmosphere (removal of residues of organic substances).

Hoesch has the intention of continuing the gur tests, in order to obtain more comparable material. Dr. Dime requests us to send him an average sample of the kieselgur lots which are used for preparing the Hoesch-catalysts.

The study of the catalysts which had been prepared with these gurs, showed also that the CO-absorption property of the samples which had been precipitated upon pretreated gurs, was more satisfactory. On testing these contacts in the laboratory reactors, their activity proved to be somewhat superior. However, the differences are only of such magnitude that they lie within the range of unavoidable variations.

Director Heitenmiller reported, then, about the catalysts which had been started since the beginning of August. These are the reactor blocks 9, 12, 1 and 11. All the catalysts are formed into 2-3 mm granules. Block 9 is still containing a catalyst which had been reduced in the normal way. The catalysts for the other blocks were reduced at a temperature higher by 5°, in accordance with Hoesch's aforementioned request. Both blocks 9 and 12, on starting them and during the period they are now in service, were showing the same behavior as that of the reactors operated in the previous months; that is, the four contacts contained in the blocks, would get irregularly started, yielding unsatisfactory

conversion and getting liquefied. In the mean time, blocks 9 and 12 have been switched over to the first step, and here they give the same picture.

Thereupon, the Hoesch starting-methods for M_2 -reactors were discussed. It was explained that Hoesch is accustomed, first, to heat up the reactors to 150-1600 without passing through any feed stock. When this temperature is reached, the reactor is charged with synthesis feed stock III. The temperature is slowly raised until the catalysts begin to show a reaction. Until last March on applying this starting procedure, all the four catalysts contained in one block showed the first reactions pretty uniformly at the same temperature. At any rate, whatever differences there were, were not important. Since that time more important variations appeared, connected with a decrease in the conversion rate. Whereas this rate had been 93% up to this time, it dropped now below 90%. The total yields, including gasol, were 155 g. with a conversion rate of 93%, whereas at the lower conversion rate only 7 g. could be produced. By decreasing the life of the catalyst and/or the charge of the reactor no substantial improvement of this situation could be obtained. The operating books show that the sulfur contents of the synthesis gas continue to be favorable, and the total sulfur content is about 0.15 g/100 m³ of synthesis feed stock.

Thereupon Mr. Zahn described the operating procedure usual with Ruhrchemie in starting M_2 -reactors. It shows an important difference from the procedure applied by Hoesch insofar, as Ruhrchemie would charge already the cold reactors with a slight quantity of gas, then would heat them up to 1400 and leave them at this temperature for 8 hours. Under these conditions no reaction takes place which could be measured or ascertained by an analysis. Yet it must be assumed that nevertheless some change takes place in the catalysts during this time, since their further behavior is fundamentally different from that of non-pretreated catalysts. Whereas on heating up the reactors to still higher temperatures and on increasing the charge at the same time, the latter ones begin to react at different and varying temperatures, the pretreated catalysts will regularly react at a temperature of 178°C (this temperature depends upon the actual operating conditions--charge, feedstock concentration), all the four catalysts of one reactor at the very same time. Until this starting procedure had been adopted, irregularities in the initial activity of the catalysts could frequently be observed, like at Hoesch's; but they have perfectly disappeared. Hoesch will give a try-out to this method. But before they do that, they will follow up how another device will work out, which they had adopted in the meantime, and which was described as follows:

On putting block one into operation, Hoesch changed the volume ratio between CO and H in the feed stock in such a way that the H contents were increased. They did so, first, because they wanted to prevent a further drop in the conversion rate, then, because they had a hunch that the CO-rich feed stock which had been used up to that time injured the catalysts under usual starting conditions. (Rest illegible).