

### Description and flow-sheets of the Oxo-Synthesis

The plant of the Oxo-Gesellschaft m.b.H. in Oberhausen-Holtten for producing fatty alcohols by means of the oxo-synthesis has three parts of manufacturing:

- 1.) Predistillation
- 2.) Oxo-synthesis
- 3.) Eaddistillation

About 30 000 to/year raw product (crude oil or Fischer-Tropsch primary product) corresponding a mixture of 10 000 tons olefin + 20 000 tons paraffin are brought to the raw oil tanks for the Oxo-Gesellschaft. The raw product is coming in two cuts boiling 175-250° and 250-310°C.

1.) In the predistillation the fraction 175-250° is distilled by atmospheric pressure in two cuts with the C-numbers C<sub>11+12</sub> and C<sub>13+14</sub>. The fraction 250-310° is distilled by vacuum with about 50-100 mm Hg pressure in two other cuts: C<sub>15+16</sub> and C<sub>17</sub>. The predistillation is a batch-distillation. By high pressure steam boilers, heated with town gas, steam with 80 kg/cm<sup>2</sup> is generated and used for heating the oil for distillation by interchange of heat.

2.) In the mixing and filtration house the four cuts are mixed with 3% Co-ThO<sub>2</sub>-Kieselgur-catalyst, which is grinded by mills.

In 9 high-pressure reactors of the oxo-synthesis-house the reaction is made with watergas by a pressure of 150 kg/cm<sup>2</sup> and a temperature of 125-135°C. The olefins C<sub>11</sub>-C<sub>17</sub> are here converted to aldehydes C<sub>12</sub>-C<sub>18</sub>.

In other 9 reactors the hydrogenation is accomplished to alcohol by hydrogen and pressure of 150 kg/cm<sup>2</sup> and a temperature of 180-185°C.

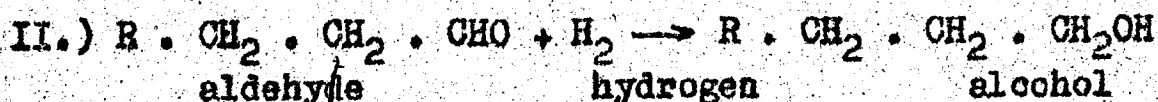
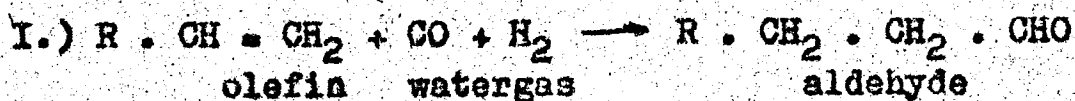
The compression of watergas and hydrogen is made in the compressor-house with compressors having a capacity of 750 m<sup>3</sup>/p.h.

The products of reaction are going in the filtration-house and there the catalyst is separated for reacting at new.

The products are now a mixture of alcohols and paraffins. The reac-

*50% on each  
end of double  
bond*

tions to get alcohols from olefins are:



Inside of the reactors are tubular radiators for heating the oil-catalyst mixture before reacting and for cooling when the temperature rises by a reaction-heat of 45 kcal/mol.

3.) In the end-distillation the fatty alcohols are separated from paraffins by high vacuum batch-distillation. There are 7 batch-distillations:

I	to separate	C <sub>11+12</sub>	paraffin	from	C <sub>12+13</sub>	alcohol.
II	"	"	"	"	"	"
III A	"	"	"	"	"	"
III B	"	"	"	"	"	"
IV A	"	"	"	"	"	"
IV B	"	"	"	"	"	"

The distillation V is distilling the residues, which are containing polymeres and higher compounds.

At last we have 4 cuts of fatty alcohols C<sub>12+13</sub>, C<sub>14+15</sub>, C<sub>16+17</sub>, C<sub>18</sub>. These alcohols are sent to firm Henkel & Cie., Düsseldorf and Th. Goldschmidt AG., Essen, for sulphonating to get washing products for washing silk, wool, artificial silk and other fine textures and for producing pharmaceuticals.

The paraffins C<sub>11</sub>-C<sub>17</sub>, separated in the end-distillation are going back to Ruhrchemie Aktiengesellschaft for cracking or other purposes.

Oxo-Gesellschaft  
 mit beschränkter Haftung  
 Oberhausen-Ratten

Production of fatty-alcohols 10 000 to p.a.

0121

Flow-sheet

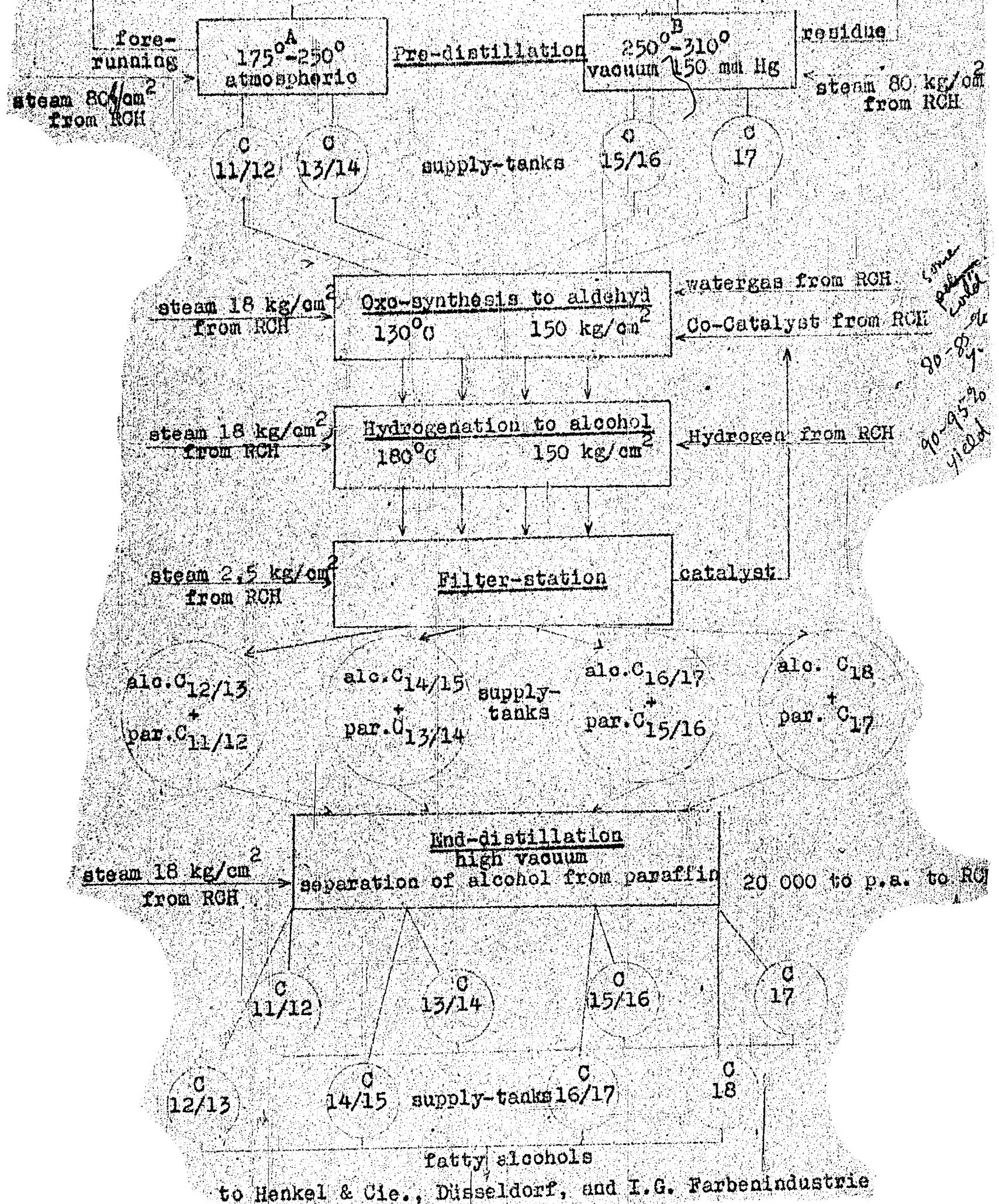
From hydrocarbon-plant of RCH 35 000 to p.a. raw-oil

Ldf./Bl.

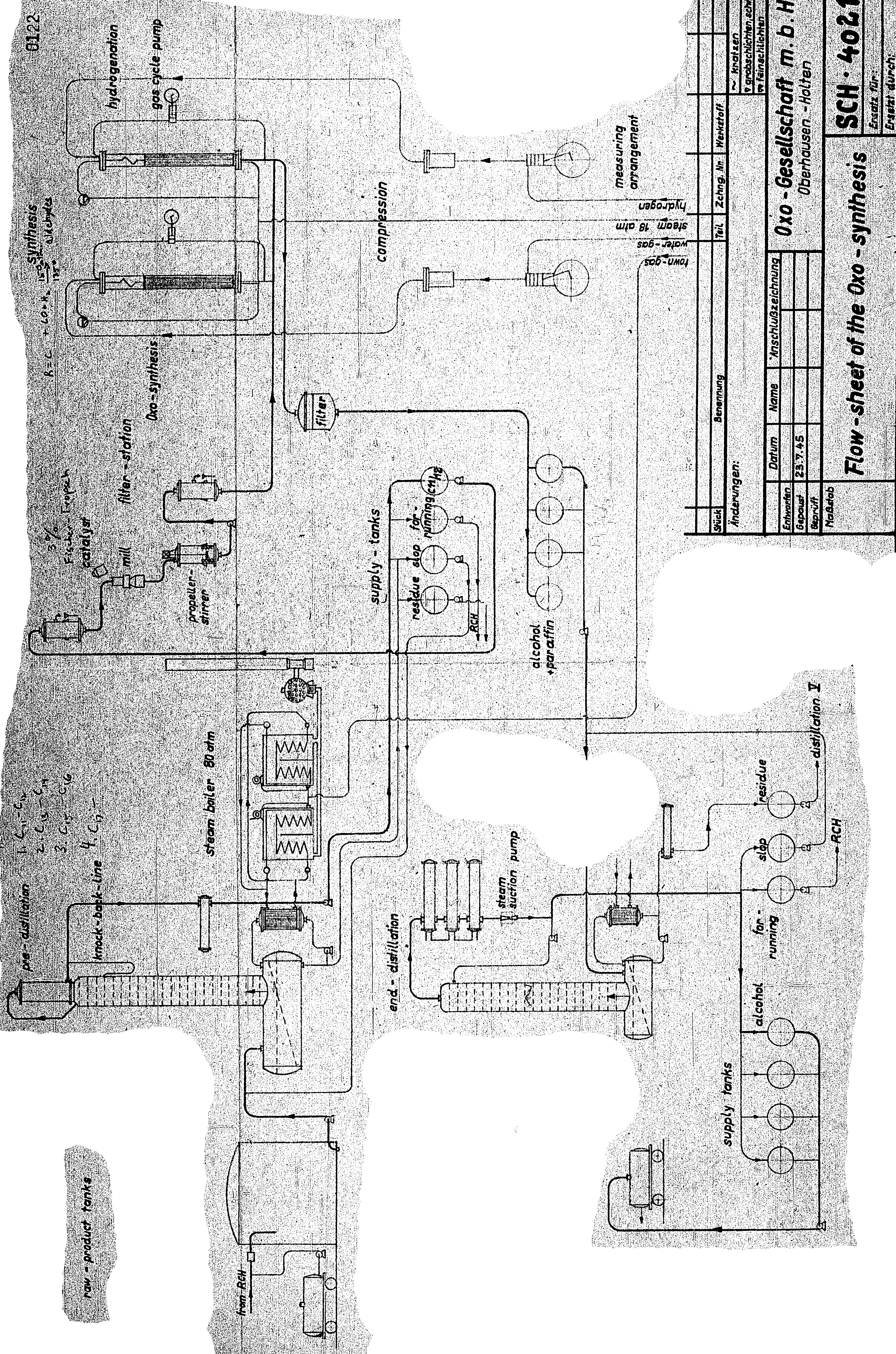
raw-oil 175°-310°, 33% olefin,  
 67% paraffin

to RCH 3000 to p.a.

to RCH 2000 to p.a.



Synthesis  
R=C + CO + H<sub>2</sub> → R-alkohol  
150°  
150°



raw-product tanks

Stück	Benennung	Teil	Zehng. Nr.	Werkstoff
Anderungen:				
Entworfen	Name	Anschlußzeichnung		
Bepreist	25.7.45			
Bepreift				
Maßstab				
<b>0xo - Gesellschaft m. b. H.</b>				
Überhausen - Holten				
<b>SCH - 4021</b>				
Essatz für: Ergeist durch:				