

Bag 2246 Target No. 30/4.09
Scholven - Item 1 (C)

February 4, 1941

Flow Sheet and Description of Special Fuel Plant AT-244

(Drawing M3893-16)

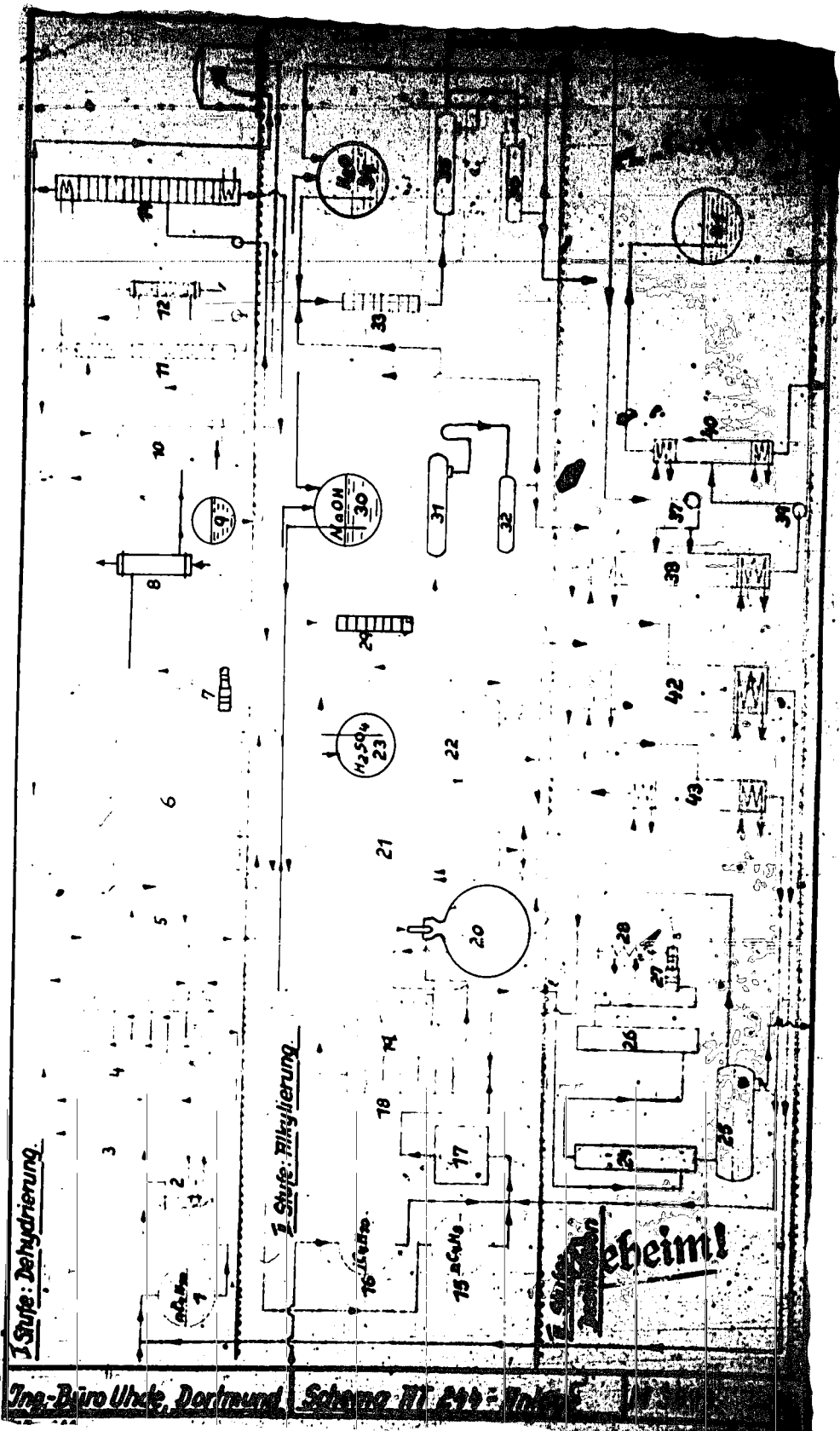
Installation AT-244 serves for the production of a special fuel from C_4 hydrocarbons obtained as a byproduct in the hydrogenation of coal. The hydrocarbons are purified, liquefied, and brought separately to the storage tanks (1) and (16) in accordance with the directions of the process. A portion of this product is taken from the storage tank (1), gasified in an evaporator (2), and flowed through heat exchangers (3), to the furnace (4), where it is dehydrogenated over catalysts. The exiting gas mixture is cooled in cooler (5), filtered, and then flowed to gasometer (6). From the latter the gas mixture is drawn through the compressor (7), and compressed to 10 atm. The gas is liquefied in condenser (8), and then sent to separating tank (9). The unliquefied portion is removed in scrubber (10) by scrubbing with oil in countercurrent flow at 10 atm., then separated from the oil in gas separator (11), and the gas mixture is returned to gasometer (6). The wash oil from which the gas was removed is returned to the circuit through cooler (12) to scrubbing tower (10). The gas which has not been absorbed by the oil in scrubber (10) is flowed to fuel gas gasometer (13), and is available for the burners of the dehydrogenation process. The Calor gas obtained in the separating tank (9) is separated in stabilizer column (14) at about 25 atm., from the low-boiling hydrocarbons and likewise flowed to gasometer (13), or else to the fuel gas installation as required. The heavy hydrocarbons obtained in the sump of column (14) are flowed in the liquid state to intermediate tank (15), which is parallel to intermediate tank (16). The second portion of the liquid hydrocarbons is stored in intermediate tank (16) and the products of the two tanks are mixed in determined ratio, and sent to butane drying (17). Other recycle products are introduced ahead of the mixing tank (18). The product flows through heat exchanger (19) to alkylating tank (20), in which a part of the product is vaporized. The gases obtained in the vaporization are flowed to a branch circuit of the butane liquefaction, whereby the C_4 gases are first scrubbed in tower (24), then neutralized in neutralizing tower (26), and finally again liquefied by means of compressor (27) and cooler (28). The liquefied products are, as already mentioned, returned to the circuit. The liquefied components obtained in the scrubbing tower (24) are separated in separating tank (25); the C_4 components are returned to the circuit, whereas the residual components are separated. The liquid hydrocarbons present in the alkylating tank (20) are alkylated in the presence of concentrated sulfuric acid. The product-acid mixture is flowed to tank (21), then to separator (22) in which the sulfuric acid is extracted and returned to the circuit. The amount of acid withdrawn from the circuit is replaced with fresh acid from tank (23). The mixture of hydrocarbons and alkylate separated in the tank (22) is flowed through heat-exchanger (19), then treated with caustic solution to neutralize the residual sulfuric acid. Dilute caustic soda solution from tank (30) is added ahead of the orifice mixer (29) and the mixture is separated in separating tank (31). The caustic soda solution obtained in this tank is sent to collecting tank (32), and then returned to the circuit, whereby part of the extremely dilute caustic soda solution is

separated at definite time intervals. The mixture of hydrocarbons and alkylate is flowed from separating tank (31) into water scrubber in which the residual caustic solution is removed. A process similar to that of the caustic scrubbing is effected in orifice mixer (33), water-supply tank (34), separating tank (35), and collecting tank (36). The product mixture freed of acid and caustic is now pumped by pump (37) into stabiliser column (38). The alkylate is pumped from the sump of the column to redistillation means (40). In this redistillation the valuable special fuel, AF-244, is recovered as head product, which is sent to the finished product storage tank (41). The product obtained in the column sump can also be used as a special fuel. The gaseous butane separated in the stabilisation is sent to the C_4 separating column (42), whereby the hydrocarbons obtained in the sump are recycled through inlet tank 1. The hydrocarbons separated in the column are thoroughly purified of the low hydrocarbons in a final column, and the heavy hydrocarbons from the sump of the column are returned to the alkylation circuit and are mixed ahead of the butane drying (17).

1 Stufe: Dehydrierung

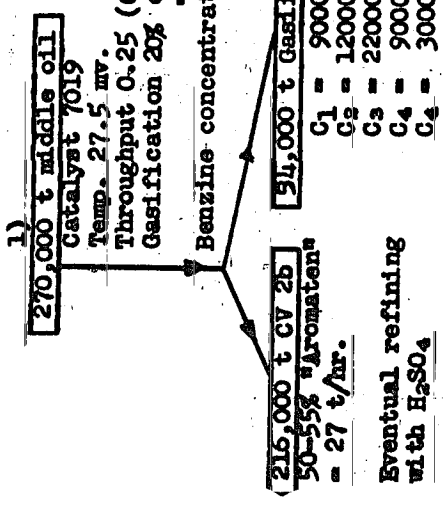
2 Stufe: Filkylierung

3 Stufe: ~~Reaktion~~ Rebeim!



- 1) Comparison of Production Method for "Aromaten Benzine" (50-55%) by Catalyst 7019
- 2) Comparison of Production Method for "Aromaten Benzine" (50-55%) by Catalyst 5058/6134 and Dehydrogenation

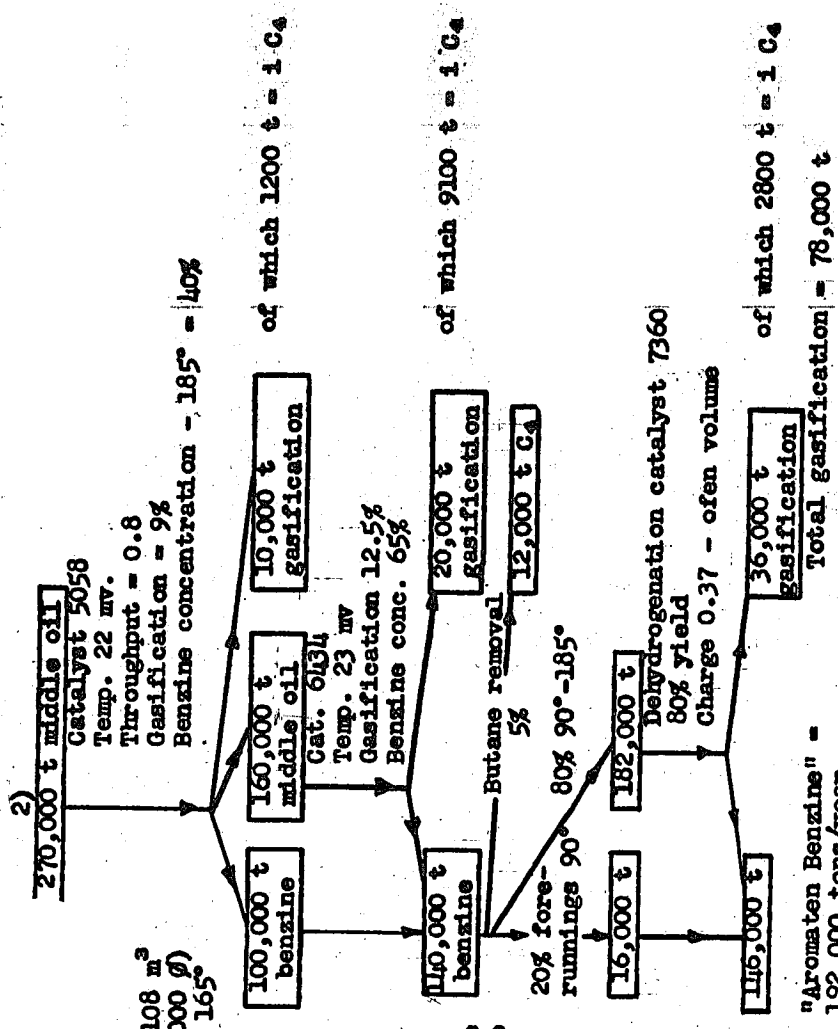
Basis: 240,000 tons auto benzine - 185° at 10% Gasification from 270,000 tons liquefaction middle oil per year



According to Process 1) the yield of isobutane = 7200 tons, including the 4200 tons isobutane from coal phase.

Bag 2246 Target No. 30/4.09 - Scholven Item 4 (A)

Buer-Scholven, Aug. 26, 1940.



"Aromaten Benzine" = 192,000 tons/year.
Even. H₂SO₄ Refining. According to Proc.2) - 17,300 t isobutane, incl. coal phase

- 1) Comparison of Production Method for "Aromaten Benzine" (50-55%) by Catalyst 7019
- 2) Comparison of Production Method for "Aromaten Benzine" (50-55%) by New Catalyst 6434 and Dehydrogenation

- 211.500 tons

= 203,500 tons

(According to data of Dr. Demuth of Sept. 18, 1940.)

Basis: 240,000 tons auto benzine - 185° at 10% Gasification from 270,000 tons liquefied middle oil per year.

