

Section 341

REFER TO FILE NO.

QC/NTME(341)

NAVY DEPARTMENT

BUREAU OF SHIPS

WASHINGTON 25, D. C.



8 November 1945.

Subj: Microfilm of German Technical Documents -  
Introductory Statement for.

1. During the course of its field trips to examine German synthetic oil plants and to interrogate German technical personnel, the members of the Oil Team of the U. S. Naval Technical Mission in Europe obtained a number of technical documents for examination. Some of these documents were directly related to certain subjects in which immediate reports were desired and were incorporated in Technical Reports as microfilm appendices. Other documents, while probably of equal technical value, were, due to limitations of time and translation facilities, saved for more detail study and examination. These latter documents have been indexed and microfilmed by the Bureau of Ships to preserve the technical information therein for future use and to make possible the dissemination necessary to give each activity an opportunity to study the particular topics of interest to it.

2. The documents shown in this series of reels have been grouped as follows:

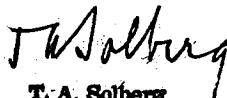
PART NO.	TITLE
1	Synthetic Lube Oils; Esters
2	Inhibitors; Crude Oil Data; Aviation Gasoline I
3	Aviation Gasoline II
4	Aviation Gasoline III
5	Diesel Oil, Fuel Production and Tests
6	Technical Data
7	Methanol and Isobutyl Oil Synthesis
8	Gas Production
9	Aviation Gasoline IV

Subj: Microfilm of German Technical Documents -  
Introductory Statement for.

PART NO.	TITLE	(cont'd)
10	Oxygen Plant	
11	Phenol Extraction; Miscellaneous	
12	Catalyst Preparation and Regeneration	
13	Flow Diagrams of Various Processes and Miscellaneous Data	
14	Miscellaneous Flow Sheets	

A complete index by parts is shown at the beginning of the series of microfilm reels, and each part is preceded by its own index. Pages have been numbered serially, those included in each part being shown on the first page of the appropriate part index. The contents of this series of film reels are not to be taken as a complete record of all the information obtained on any subject.

3 The Bureau of Ships Research Branch would appreciate receiving a copy of any translations that may be made of these data in order to complete its technical files.



T. A. Solberg  
By direction of  
Chief of Bureau

## PART No. 1

## SYNTHETIC LUBRICATING OILS - ESTERS

Doc.  
No.

- 1 Photostat of flow sheet #50530 of 1941: "Sketch of synthetic oil installation" by the Ethylene process.
- 2 Blueprint of Drawing M10752-2 of December 1942, Leuna, flow sheet "Sketch of cracking and separation plant" for the preparation of 6000 tons per year of ethylene out of 8200 tons per year of ethane.
- 3 Blueprint of drawing M2326-1 of September 1938, flow sheet of acetylene hydrogenation process.
- 4 Blueprint of drawing M3619-1 of August 1940, Leuna, Sketch of the P<sub>3</sub> plant in Building Me 981 - showing treatment of the sump phase.
- 5 Blueprint of drawing M10274-2, Leuna 1942 - flow sheet of the ester oil plant of building Me 1016 for four different types of esters.
- 6 Blueprint of drawing M3295-1 of 1940 - flow sheet of the formaldehyde and propionaldehyde preparation of the P<sub>3</sub> charge - 10 charges per day.
- 7 Blueprint of drawing without number, of 1938 - flow sheet of Synthetic lube oil plant from ethane C<sub>2</sub>H<sub>6</sub> and methane through ethylene C<sub>2</sub>H<sub>4</sub>.
- 8 Blueprint of drawing M6013-1 of December 1943, Leuna - flow sheet of lube oil treatment.
- 9 Blueprint of drawing M3184-1 for Building Me-981, Leuna 1942 - Sketch of the T-plant, starting with adipic acid and benzol sulfgas.
- 10 Blueprint of drawing M4380d-1 of October 1941, Leuna - flow sheet titled "Sketch of the E-oil plant Me 981, 2000 tons per year."
- 11 Blueprint of drawing M5445-1 of October 1942, showing flow diagram and location of measuring instruments for the E-oil plant.
- 12 Blueprint of drawing 3546-1 of 1942, flow diagram of oil plant in Building Me 126.
- 15 Blueprint of drawing M4407-1 of July 1941, flow diagram of the E-oil plant, 200 tons per month, showing esterification, washing, distillation, and blending of lube oil.

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- 14 Blueprint of drawing M6017-1 of December 1943, Building Me 955, Leuna - "Sketch of thermal cracking plant" - flow sheet of the ethylene - lube oil process with list of detail drawings.
  - 15 Blueprint of drawing M6013-1 of December 1943, Building Me 124. "Sketch of the mix-polymerization plant Me 124" for the preparation of lube oils - flow sheet.
  - 16 Blueprint of drawing M7564-2, 1940 - Paraffin plant, Building Me 453 - 2 tons per month.
  - 17 Blueprint of drawing M3952-1 of 1941. Sketch of the M4 Plant, Building Me 924 for polymerization - Location of measuring instruments.
  - 18 Blueprint of drawing M5607-4 - Cracking tests - Sketch of middle oil cooling in the gas phase - Building M 499.
  - 19 Blueprint of drawing M10468-2 of 1942. K-oil plant - preparation of Ester 515, Building Me 1016.
  - 20 Blueprint of drawing M10466-2 of 1942. E-oil plant - preparation of Ester 623, Building Me 1016.
  - 21 Blueprint of drawing M10467-2 of 1942. E-oil plant - preparation of Ester 426, Building Me 1016 - with a typewritten note by Fischer on Esters 504 - 515 623 and 426, dated 19 October 1942.
  - 22 Blueprint of drawing M10469-2 of 1942. E-oil plant - preparation of Ester 504, Building Me 1016.
  - 25 Blueprint of drawing M2645-1 - general flow sheet of the polymerization process in Building Me 126.
  - 24 Blueprint of drawing M5969-1, Leuna, November 1943. Building Me 942 - "Flow sheet of the Linde plant" for the synthetic oil preparation - flows of  $\text{CH}_4$  and  $\text{C}_2\text{H}_6$  and list of detail drawings.
  - 25 Blueprint of drawing M5956-1, Leuna, October 1943. Building Me 942 - "Flow sheet of the cracked gas washing plant" for the preparation of synthetic oil 900 - with list of detail drawings.
  - 26 Blueprint of drawing M5033-2, Leuna, of 1938. Building Me 944 - "Flow sheet of paraffin removal plant."
  - 27 Blueprint of drawing M9012-4, Leuna, 1943. Building Me 493 - Sketch of the Polymerization plant for a pressure of 25 atm.
  - 28 Blueprint of drawing M2834-1, Leuna 1939. General sketch of the propane plant and paraffin removal - showing safety features, in Building Me 944.

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29. Blueprint of drawing M2921-1, Leuna, 1939 - Sketch of the paraffin separation plant with asphalt removal.
  50. Blueprint of drawing M5822-2, Leuna, 1939. Research installation on lube oils in Building Me 96a. with crotonic aldehyde, benzol and acetic acid.
  51. Blueprint of small sheet O/1117 of August 1941 for the preparation of low pour oil at Schkopau.
  52. Five-page typewritten report of Dr. Lowenberg dated Leuna 14 November 1941 on Ester Oils, at Schkopau, prepared from methyladipic acid.
  35. Two-page typewritten report by Dr. Metzger of Leuna 22 January 1942 and one flow sheet, on the preparation of synthetic cutting oil S<sub>1</sub> by mixture of two esters.
  34. Sketch O/1182 of February 1942 on the preparation of cutting oil with adipic acid, isobutylaldehyde and soda wash.
  35. Typewritten report, two pages, with sketch A2-5198-8, of 7-8-42-Leuna, by Eng. Schwale on the preparation of synthetic oil E - with esters 426 and 515.
  36. Typewritten sheet on "cutting oil" and on "transformer oil" 19 November 1942 Leuna.
  37. Typewritten data on Ester - Leuna - 10-8-42 type R<sub>1</sub>COO-(CH<sub>2</sub>)<sub>4</sub> - COO R<sub>2</sub>.
  38. Blueprint of drawing M5202-1 of 1942 - Sketch of esterification - high-pressure steam flow sheet.
  39. Blueprint of drawing M5068-1 of November 1942 - Leuna, Building Me 1016 - E-oil plant. Washing flow sheet, for esterification with esters 623, 426, 515 and 504.
  40. Report #5475/44 VI-S of the Physico-Technical Reichs Institute, Berlin-Charlottenburg of 4 May 1944. "Research on the boundary lubrication of an alumina-silicon alloy" - 7 pages and 6 charts.
  41. Seven typewritten pages and four tabulations by Dr. Metzger, Leuna - 10 March 1942 - on the Ester plant at Leuna.
  42. I.G. three-page report of 15 February 1944 - Ludwigshafen - on the preparation of esters. in preparation for a patent application.
  45. I.G. four-page report of 19 June 1942, Ludwigshafen, on the preparation of esters, for a patent application.

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- 44 Four-page report by Dr. Hanisch, Leuna 21 July 1945 on the preparation of various esters and some inhibitors at Leuna, Schkopau, and Heydebreck 2.
- 45 Correspondence on "Corrosion inhibitor" of formula  $R-X-(R_1-COOH)_n$ . R and  $R_1$  being aliphatic saturated or cyclic hydrocarbon residues of at least 6 C/atoms, X being the group  $-SO_2N<$  or another group containing  $CO-N<$  or  $-C-S-N<$  N=1 or 2; the group  $X-(R_1-COOH)_2$  being bound to R once or several times, dated April 1943. I.G. Frankford Am Main-Hochst and up to November 1944. Symbol = KSE, used in aviation gasoline.
- 46 Letter of 25 August 1944 from Physico-Technical Institute Berlin to Dr. Zorn, Leuna on Ester Oils and their value on boundary lubrication.
- 47 Group of two typewritten notes on Ester preparation by Dr. Zorn, 1941.
- 48 Blueprint of drawing M5255-1 of April 1941, Building Me 981 at Leuna - flow sheet for the preparation of synthetic oils, esterification, washing, distillation, raffination and blending.

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PART NO. 2  
INHIBITORS; CRUDE OIL DATA;  
AVIATION GASOLINE I  
PART ONE - INHIBITOR PLANT

30108

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- 1 A folder of calculations, charts and data from the I.G. Farbenindustrie A.G. dated 25 November 1942 at Leuna, about the proposed inhibitor plant of a capacity of 3.2 tons per month. Sketch 924105 is attached. The following are detached but part of the report:
- 2 Blueprint of Sketch 45 dated February 1943 - flow sheet of plant.
- 3 Blueprint of drawing M-11368-2 July 1943. Flow sheet of inhibitor plant for 3.2 tons per month, in 3 loads per month.
- 4 Ditto - revised M-11368-C-2.
- 5 Blueprint of drawing M-5882-1 October 1943. Piping flow sheet for Building Me 1016-M with list of detail drawings of equipment.
- 6 Blueprint of drawing M-5585-1 of July 1943 - Leuna - Building and location of apparatus for inhibitor plant Me 1016-M.

PART TWO - DATA ON EUROPEAN OILS

(all dated at Leuna, October 1942.)

- 7 Russian crude oil data on the 1939 Russian oil situation, quantities and specifications of various products from the various Russian fields.
- 8 Data on the conquered Malkop oil field.
- 9 Possible yield of crude oil in the Ural-Volga fields.
- 10 Notes on Hungarian crude oil.
- 11 Analyses of crude oil and byproducts of six various German fields: Heide, Neusiede, Pechelbronn, Fistersdorf, Nienhagen, and Reitbrook.
- 12 Blueprint of drawing N-3757-2 I.G. Ludwigshafen of 1936 - Flow diagram of the oil hydrogenation plant of the A.N.I.C. (Italian) with Albanian Pacura Oil.

PART THREE - AVIATION GASOLINE

- 13 Report No. 363 of the I.G. Farbenindustrie A.G. Leuna, February 1943 by Dr. Wals "The hydroforming process," for aviation gasoline, 46 pages of text, 25 curves, 45 tabulations, and blueprint of drawings M-3392-8 of plant I at low temperature and plant II at high temperature.

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- 14 Flow sheet and balances of the H.F. plant at Moosbierbaum - blueprint of drawing M7748-4 of 1944.
- 15 Blueprint of drawing M6857-2 of December 1939 - Leuna, Sketch of the hydroforming plant, Kellog process.
- 16 Photostat of sketch OS-183a of 1943 of the ARGBIN plant (aerobenzin) otherwise unidentified.
- 17 Blueprint of drawing M-7082-2 of March 1940. Leuna - Location of the measuring instruments in the hydroforming plant.
- 18 A 10-page paper by Dr. Kaufmann, Leuna, December 1941 on the H-F process and the Moosbierbaum plant, but no interest because all pictures and curves are missing.
- 19 Blueprint of drawing M-3541-2 - Leuna March 1941. Flow sheet of the H-F (hydroforming) plant for Leuna for a proposed capacity of 24 M<sup>3</sup> of aviation gasoline per hour.
- 20 Blueprint of drawing M3515-1 - July 1940 - Leuna - General diagram of the H.F. Catalyst Treatment Indication of all the equipment and numbers of the detail drawings.
- 21 Blueprint of drawing M-5356-1 of February 1943 - diagram of the Häuber cracking plant and the copper solution wash.
- 22 Blueprint of drawing M1556-8 undated, of I.G. Leuna - showing flow diagram of gas and liquids.
- 23 Blueprint of drawing M6155-2 of Leuna, June 1939 - sketch of the Isolentyl-oil-polymerisation.
- 24 Blueprint of drawing M5168-1 - Leuna 1942 - diagram of the Häuber cracking plant at Leuna, Building Me 955 with location of measuring instruments.
- 25 Blueprint of drawing M3411-1 - Leuna June 1940 - Details of the regenerator oven and its distribution mechanism.
- 26 Blueprint of drawing M3402-1 Leuna June 1940 - Assembly drawing of the regenerator.
- 27 Blueprint of drawing M-7442-2 Leuna June 1940 - Flow diagram of regenerator and data on apparatus (size, temperature, volume, etc.).
- 28 Blueprint of drawing F.Z.A. 34 of Building Me 588 Detail of construction of the refractories of the oven with the newly developed "Tulip Grate."



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- 29 A folder of 7 letter-size blueprints' numbers, M-2004-16, M2171-16, M2166-16, M2167-16, M2168-16, M-2169-16, M2170-16, concerning the Ethane cracking plant in Building Me 588 at Leuna 1957 giving drawing numbers of all details.
- 50 A letter-size tracing of December 1957 giving the sketch of the testing plant for ethane cracking as per Dr. Häuber.
- The following pertain to the discovery in 1957 of the so-called "Tulip-type Grate" for the ethane-cracking oven, by Dr. Klein of I.G. Farbenindustrie.
- 51 Patent application 12196 - History of the invention.
- 32 Two-page application OZ12196 - Tulip grate, and 5 photostat numbers: FZA 3a, 15, 22, 23, and 25a (2 of each), showing various sections of the Tulip grate.

AVIATION GASOLINE II

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No.

- 1 Blueprint of drawing M3040-1 of 1939 - Diagram for an industrial installation of T-52 at Föhlitz for 12,000 tons per year.
- 2 Blueprint of drawing M2991-1 of 1939 - Diagram for an industrial installation of T-52 at Scholven for 22,000 tons per year.
- 3 Blueprint of drawing M6818-2 of 1940 - Leuna - Piping diagram for synthetic gasoline, Building Me 958. T52 plant at Leuna.
- 4 Blueprint of drawing M3364-1 of August 1940 - Diagram of the plant for a production of 19,000 tons per year of T-52 - Sheet #1 - Dehydrogenation.
- 5 Ditto - Sheet #2 - Compressors, Condensers, Coolers, and Oil Wash.
- 6 Ditto - Sheet #3 - Gas Removal from the Wash Oil.
- 7 Ditto - Sheet #5 - Pressure Polymerization.

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PART NO. 4  
30331 AVIATION GASOLINE III

30316

HYDROGENATION UNDER PRESSURE  
DHD=Druck-Hydrier-DestillationDoc  
No.

- 1 Flow sheet, undated and unidentified of the DHD process for gasoline production.
- 2 Blueprint of drawing M-7689-4, 1941 Leuna - Sketch of the Redistillation of DHD gasoline in the .30-tray column, Building Me 821c.
- 3 Blueprint of drawing M8626-4, 1942 Leuna - Sketch of the redistillation of DHD gasoline in Building Me 821. This drawing is more general than the preceding one.
- 4 Blueprint of drawing M10049-4, 1944 Leuna - Redistillation of the DHD gasoline in Me 821, different column.
- 5 Blueprint of drawing M9000-4, 1943 Leuna - Proposed plan for the removal of gas oil in connection with the DHD plant.
- 6 Blueprint of drawing without number from Leuna 1944. Flow sheet of the proposed DHD plant for the preparation of light gasoline from stripper gasoline and gasoline from various other origins.
- 7 Blueprint of drawing M8854-2 Leuna 1941 - Sketch of the cycle of the DHD process.
- 8 Blueprint of drawing M8963-2 Leuna 1941 - Same as M8963-2 with some changes, and indication of sizes of pipings.
- 9 Blueprint of drawing M10518-2 Leuna 1942 - Perspective view of the DHD ovens, piping connections and location of measuring instruments.
- 10 Blueprint of drawing M-10601-2 Leuna 1942 - Perspective view of the DHD expansion plant. with three large expansion tanks, and piping connections.
- 11 Blueprint of drawing M-11163-2 Leuna 1943 - Flow diagram of the DHD plant.
- 12 Blueprint of drawing M12343-2 Leuna 1944 - Latest flow sheet of the DHD plant.
- 13 Blueprint of drawing M-5006-4 Leuna 1939 - Sketch of the gasoline washing plant in Me 826b (a caustic washing).
- 14 Blueprint of drawing M5158-4 Leuna 1939 - Sketch of the gasoline washing plant with removal of condensed oil.
- 15 Blueprint of drawing M5252-4 Leuna 1939 - Sketch of the gasoline washing plant in Me 826a and 826c (caustic washing).

DIESEL OIL, FUEL PRODUCTION AND TESTS  
REPORTS ON VARIOUS FUELSDoc.  
No.

- 1 Thesis of Dr. Kneule, 1937, at the Technische Hochschule Munich: "Report on the Investigation of the Combustion Process in the High-Speed Diesel Engine" - 62 pages.
- 2 Report #370 of I.G. Farbenindustrie A. G. Oppau of February 1939: "Research on the Combustion Process in the Hesselman Engine with the I.G. piezometric quartz cathodic ray indicator. Six pages of text and nine of figures.
- 3 Report #386 of I.G. Farbenindustrie A. G. Oppau of June 1939: "Influence of the injection quantity, cooling temperature, RPM, and condition of air on the combustion process in the Diesel Engine" - 13 pages of text and 14 pages of pictures and data.
- 4 Report of tests of the Automotive Institute of the Air Corps Academy, Berlin Gatow, of 15 September 1941 on: "Study of Injection Nozzles and Use of Information Obtained from March to August 1941 - 19 pages of text and 11 of pictures.
- 5 Three-page report Ludwigshafen I.G. 1945. Tests on the preparation of special fuels - (1) nitration of hydrocarbons and phenols; (2) cold resistance of nitrated aromatics in gasoline; (3) cold resistance of hydrogenation products.
- 6 Report by A. D. Petrow (Bulletin de l'Academie des Sciences de l'URSS. 1941). Five pages of text and tables. Knock resistance and pour points of individual hydrocarbons used in Diesel fuels
- 7 Report by Oettinger, Ludwigshafen, June 1941 on "Diesel fuel production in the coal hydrogenation plants" - 4 pages of text and 2 tables.
- 8 Copies of data on various Diesel fuels of various origins - Brown coal tars and diluents, physical properties and cetane numbers - I.G. 1939.
- 9 Two-page report by Fromberg - Ludwigshafen 1941. "Comparison of engine output with oxygen and with N<sub>2</sub>O."
- 10 Reprint of article of Dr. Penzig (I.G. Farben) on the "Ring Verfahren" (N<sub>2</sub>O in air of aircraft engines) 1943.
- 11 Reprint of article by O. Lutz Brunswick, 1945 on "Fundamental questions on the use of oxygen carriers for the supercharge of aircraft engines."
- 12 Reprint of article by H. Triebnigg, Berlin, 1945 on: "Single cylinder tests with internal cooling."
- 13 Reprint of article by O. Holfelder, Berlin-Gatow, 1945 on: "Engine Operation with Safety Fuels."

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- 14 Blended Diesel fuels and coal tar oil. Reprint of article in "Oel and Kohle" December 1938.
- 15 Reprint of article on - Standardized testing method for Diesel and for Otto fuels on the basis of ignition delay, by H. Ernst and O. Wiedmaier of the Technische Hochschule Stuttgart - 1940.
- 16 Reprint of article by Dr. Wiedmaier in Oel and Kohle in 1939 - on "Research on Diesel fuels by various testing methods" - 3 pages.

PART NO. 6  
TECHNICAL DATA

This book consists of single sheets of engineering data bound together by "Ruhrchemie" at Oberhausen, for the use of their draftsmen and engineers. It covers the following fields:

- A. Construction Drawings  
Drawing symbols  
Threads & screws  
Pipes & nipples  
Drives - Pulleys - Belts - Gears  
Railroad equipment
- B. Calculation Data  
Materials  
Resistance  
Energy and its use  
Heat  
Thermodynamics  
Physics  
Miscellaneous

30719 - 30775 METHANOL AND ISOBUTYL OIL SYNTHESISDoc.  
No.

- 1 An 11-page bibliography on the subject of methanol and other high molecule alcohols from CO and H<sub>2</sub>O, from the Leuna library - 1945.
- 2 A calculation sheet and 2 curve sheets on the reaction  $2CO + 4H_2 \rightarrow C_2H_4 + 2H_2O$ , Leuna 1942.
- 3 Data (typewritten) on the history of methanol synthesis in Germany and other countries with a list of patents of Dr. M. Pier since 1923 - 9 sheets.
- 4 Blueprint of drawing M-9239-2 - 1941 - Sketch of the CO<sub>2</sub> and water pressure washing for the Synol plant at Leuna.
- 5 Blueprint of drawing M-4798-16 - Sketch of the OXO process (no date).
- 6 Blueprint of drawing M-3458-16 of 1940 - Sketch of the OXO-test plant - Leuna (2 copies).
- 7 Blueprint of drawing M-8929-4 of March 1943 - Leuna - Sketch of the Ether Removal from Isobutyl of column IIIA in Building Me 417.
- 8 Blueprint of drawing M6108-2 of June 1939 - Leuna - Distillation plant in Building Me 490 Isobutyl distillation columns #2 to 7.
- 9 Blueprint of drawing M5438-4 of October 1939 Leuna - Sketch of the preparation of pure methanol.
- 10 Blueprint of drawing M-1682-1 of 1937 - Leuna - Sketch for the preparation of isobutyl to iso-octane.
- 11 Blueprint of drawing M4799-1 - Leuna February 1942 - Flow sheet of the preparation of synol byproducts in Building Me 458 with list of detail drawings.
- 12 Letter-size photostat, undated - flow sheet of the cycle operation in the methanol and isobutyl oil plant.
- 13 Letter-size flow sheet of the isobutyl preparation in 1940 - Columns 1 to 7 in Building Me 490 and Columns 5 to 7 in Building Me 417.
- 14 Letter-size photostat - flow sheet of methanol and isobutyl recovery in Leuna 1939 - #45591
- 15 Letter-size photostat of preparation of pure methanol in Building Me 982 - Leuna - undated.
- 16 Plan view of Building Me 982 at 1:500 scale.
- 17 Letter-size sketch of September 1940 flow sheet for methanol.

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- 18 Blueprint of letter-size sketch O/996. Project for the construction of an oil pressure vent on the methanol and isobutylol chambers in Me 355.
  - 19 Photostat of letter-size sketch O/1421 undated, 1450 m/m fractionating column (50 trays) for the separation of dimethylether and light olefins from the raw isobutylol.
  - 20 Photostat of letter-size sketch O/1014 undated, "Separation of the methanol from the higher molecular water soluble alcohols."
  - 21 Blueprint of drawing O.A. SE2 of July 1942 - New Process for the preparation of pure methanol from raw methanol containing ether - flow diagram.
  - 22 Blueprint of drawing M2749-8 - Leuna December 1939 - Sketch for the reaction of methanol and carbon monoxide.
  - 25 Blueprint of drawing M-3539-8 of March 1941 - Leuna - Sketch of a pure methanol distillation plant for 22.9 tons per day, for Japan, Niton Koggo.
  - 24 Blueprint of a sketch, November 1939 for the production of 50,000 tons per year of air gas and 50,000 tons per year of tanol.
  - 25 Blueprint of drawing M3571-8 of April 1941 - Leuna - Sketch of a pure methanol distillation plant, a batch proposition, for Niton Koggo.
  - 26 Blueprint of drawing M2450-8 of March 1939 - Balance sheet for the production of 50,000 yearly tons of iso-octane and 35,000 yearly tons of gasoline, from mixture of CO + 2H<sub>2</sub>.
  - 27 Blueprint of letter-size sketch of 1939, Ludwigshafen - on the Butyl synthesis.
  - 28 Blueprint of letter-size sketches of 1939 on air gas production, Sketch # III.
  - 29 Ditto - Sketch # IV.
  - 30 Ditto - Sketch # VI.
  - 31 Ditto - Sketch # VII.
  - 32 Blueprint of drawing M3675-8 of May 1941 - Leuna - Sketch of the distillation of fuels from the middle-pressure synthetic plant - "Auschwitz Gasoline" 75,000 yearly tons of gasoline, 7,500 yearly tons of gas oil.
  - 33 Blueprint of drawing 16159 of the Degussa, January 1944 - layout of the testing installation for methanol at Wolfgang.



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- 1 A 6-page mimeographed note of instructions dated at Böhlen on 5 January 1945 titled: "Measures of Protection against Freezing Damage in case of Complete Stillstand of the Gas Works."
- 2 A 22-page booklet dated Oppau March 1940 on "Cost Comparison for 2 Types of Synthesis Gases, from Coke or from Water Gas."
- 3 The pressure gasification of solid fuels with oxygen by Dr. F. Danulat reprint from article in "Gas und Wasserfach" 1941.
- 4 Same article as (3) in English (illustrated)
- 5 A similar article in German by same author.
- 6 Lurgi pamphlet on "High-Pressure Gasification Installation.
- 7 Reprint of an article in "Oel und Kohle" of 1942 by Dr. A. Rettenmaier on "Present Status of the Development of Total Gasification" describing the Bubiag-Didier process, Kappers process, Pintsch-Hildebrand process, Schmalfeldt-Wintershall process, Winkler process, Lurgi High-Pressure process, Thyssen-Galocsy process, Demag process, Ruhrgas process.
- 8 Three pages of typewritten text and 5 photostats of pictures for Patent Application #OZ 12196 concerning the "Tulip-type Grate" for gas generators.
- 9 Tracing of drawing 2105-2 from "Mineröl-Baugesell" of March 1937 - for the Brinker layout connected with the Winkler generator.
- 10 Letter-size blueprint of a sketch of the high-pressure gasifier of the A.S.W. dated 1941 showing relations of the 3-main parts.
- 11 Blueprint of drawing 487-1 of Braunkohle Benzin of 1935 showing complete assembly of the Winkler generator, location of all valves and all measuring instruments.
- 12 Blueprint of drawing F.A. 1032-2 of Theisen GmbH. of 1940 showing the Theisen gas washer.
- 13 Colored blueprint of drawing ATL 9547-1 of Friedrich Uhde, Dortmund of 1942 showing the piping layout #II - Propane separation, redistillation and stabilization.
- 14 Blueprint of drawing 3-A-56153 of BAMAG-MEGUIN May 1935 - Tower cleaning plant for water gas, capacity 700,000 m<sup>3</sup> per day for BRABAG, Böhlen.

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- 15 Blueprint of drawing ~~M-A39714~~ of BAMAG-MEGUIN - 1943, Ash disposal outlet with separate ~~gratebox~~, uncooled for BRABAG.
  - 16 Colored blueprint of drawing He 65172f of BAMAG-MEGUIN Butzbach, 1941, Tower cleaning plant for Böhlen.
  - 17 Blueprint of drawing Me-2956 - Leuna - 1939 - Flow sheet of the alkazid plant.
  - 18 Tracing of drawing Ze-1150 of BRABAG July 1943 - Layout of piping for the alkazid plant.
  - 19 Blueprint of drawing M4998-8 of Leuna 1943 - Silica-gel drying plant for H<sub>2</sub>S - Building Me 936.
  - 20 Blueprint of drawing M-1412-1 Leuna 1937 - Sketch of the sulphur removal plant in Buildings Me 40, Me 285, and Me 285a. Desulphurizing of the gases and extraction of the carbon dioxide.
  - 21 Three copies of blueprint of drawing M-202-8 - 1931 - Sketch of alkacid plant.
  - 22 Blueprint of drawing MG215-1 Leuna - 1944 - Sulphur burning installation for Building Me 951.
  - 23 Blueprint or drawing M 10727-2 Leuna - 1942 - Project for an ethane cracking plant.
  - 24 Blueprint of drawing 6987/1 1943 of C. Otto - Details of sulphur ovens 25 m<sup>3</sup> capacity.
  - 25 Blueprint of drawing 6987-5, 1943 of C. Otto - Sketch of the sulphur ovens (Claus ovens) plant.
  - 26 Blueprint of drawing B-0610a - from Otto Dietrich - 1936 - Heating gas piping layout - temperatures of 300 to 500°C.
  - 27 Blueprint of drawing AC-6987/4 - 1943 of C. Otto - Burner layout and details for the Claus plant.
  - 28 Blueprint of drawing AC-6987/18 - 1944 of C. Otto - Sulphur pan.
  - 29 Blueprint of drawing AC-6987/7 - 1944 of C. Otto - showing the water traps for air and H<sub>2</sub>S lines.
  - 30 Blueprint or drawing AC-6987/6b - 1944 of C. Otto - showing the sulphur receptacles (detail drawing).
  - 31 Blueprint of drawing AC-6987/15 of C. Otto - 1944 - Project for the installation of the Claus plant.

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- 32 Blueprint of drawing AC-6987/17 of C. Otto - 1944 - Foundation drawing for the Claus plant.
- 33 Blueprint of drawing AC-6987/16 of C. Otto - 1944 - General layout of the Claus plant.
- 34 Blueprint of drawing M-8035-4 - Leuna - 1942 - Sketch for the sulphur removal of synthesis gas for synol production in Building Me 285 - General layout.
- 35 Blueprint of drawing M9378-4 - Leuna - 1943 - Silica-gel gas drying for H<sub>2</sub>S.
- 36 Blueprint of drawing 431-2 of BRABAG-Böhlen - 1936 - Piping diagram for the cleaning of CO (high and low-pressures).
- 37 Blueprint of drawing 100001-b-1937 of Lurgi-Adsorber 5000 m/m I.D. all in English.
- 38 Blueprint of drawing 100002 - 1937 - of Lurgi in English, sections and details of Adsorber.
- 39 Blueprint of drawing 100004 - of Lurgi - 1937 - in English - square meshed steel grids 30x3m/m for adsorber.
- 40 Blueprint of list of material for adsorber of above drawings.
- 41 Blueprint of drawing 513366 of Aug. Klönne, Dortmund 1939. High-pressure gas purification plant - details of the grating - for ASW-Böhlen.
- 42 Blueprint of drawing 526445 of Aug Klönne, Dortmund 1941. General assembly of the high-pressure gas purification plant - for ASW Böhlen.
- 43 Blueprint of drawing 711395 of Aug Klönne - Dortmund 1941 - 4 purification towers for the high-pressure gas purification plant - ASW Böhlen - Details of assembly.
- 44 Blueprint of drawing 722822 of Aug Klönne - Dortmund - 1941 - Lower part of the high-pressure gas purification plant - for ASW Böhlen.
- 45 Blueprint of drawing N-3909-1 - Ludwigshafen - 1941 - High-pressure part of the CO - purification and the final CO<sub>2</sub> removal - at Heydebreck H<sub>2</sub> 380.
- 46 Blueprint of drawing N-9948-2 - 1941 - Ludwigshafen - Installation for the cleaning of CO gas at Heydebreck - General layout and location of apparatus.
- 47 Blueprint of drawing N-3842-1 - Ludwigshafen 1941 - Low-pressure part of the CO - purification plant at Heydebreck He 382.
- 48 Blueprint of drawing M5179-8 - Leuna - 1943 - CO purification - Sketch of a gas washing plant with a 4-tray column for 2200 m<sup>3</sup>/hour of gas containing 3 grams of NH<sub>3</sub> per m<sup>3</sup> of gas.

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- 49 Blueprint of drawing M5003-2 - Leuna 1938 - Piping layout for the cleaning of H<sub>2</sub>S - containing CO<sup>2</sup> gas in Building Me 522.
- 50 Blueprint of drawing 722834a of Aug Klönne, Dortmund - 1942 - Piping layout for the gas purification plant at Rheinpreussen, Homberg.
- 51 Blueprint of drawing 711388 of Aug Klönne, Dortmund, 1941 - Assembly of the cleaning plant at Rheinpreussen, Homberg.
- 52 Blueprint of drawing 711388a - 1942 as above but corrected.
- 53 Tear sheets from VDI proceedings - 1940. Article by Walter Grimm, Homberg, "Recovery of liquids from coke gas, synthesis gas, and other gases" - 5 pages.
- 54 Blueprint of drawing M12686-2 - Leuna - 1944 - Flow diagram of the copper solution regenerator.
- 55 Blueprint of drawing S16-1 of BRABAG - Böhlen - 1935. Circuit of phenolated water in the Winkler plant.
- 56 Blueprint of drawing ATL 1010 of Fr. Uhde - Dortmund - 1941 - Flow sheet and location of measuring instruments in gas purification plant.
- 57 Blueprint of drawing H-9998 of the Deutsche Ton und Steinzeug Werke A.G. Krauschwitz - 1945, showing acetylene cleaning plant (2 copies).
- 58 Blueprint of drawing without number, 1945 - Ludwigshafen - Sketch of the Leuna - cold plant.
- 59 Blueprint of drawing M5270-1 Leuna 1942 - Assembly drawing of the enriched gas installation in Building Me. 914 - Ethane-propane-butane.
- 60 Blueprint of drawing 11040 of Linde Ice Machine Co. 1942 - Flow sheet and location of valves and instruments in the fuel-gas plant.
- 61 Blueprint of drawing 35/2188a of Linde Ice Machine Co. 1935 - Flow sheet of the Propane-Butane plant in Building Me 879 at Leuna.
- 62 Blueprint of drawing W5283-8 - Ludwigshafen 1939 - Sketch of the Nitrogen production plant for Linz, Ostmark - gas quantities indicated.
- 63 Tracing of a drawing of January 1943 showing NH<sub>3</sub> synthesis by the IG process and as proposed by Linde.
- 64 Tracing - drawing SK-300143 - Coke oven gas reaction by Linde process - 1943 - Leuna.
- 65 Tracing - drawing SK-300144 - Low-temperature process for purification of synthetic NH<sub>3</sub> gas Leuna 1943.
- 66 Tracing - drawing SK-20543 - Leuna undated. Raw gas treatment for synthesis of NH<sub>3</sub> - Recycle and expansion process.

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- 67 Report in English by management of Leuna works of IG FarbenIndustrie AG to the US Military Government in Merseburg, of 24 April 1945 concerning the rehabilitation of the Leuna plant and the start of operation following discussion with the NAVTECHISEU oil and petroleum group - 2 pages and 20 tables - 1 original and 3 copies.
- 68 Blueprint of drawing M-4045-2 - Leuna 1938 - Sketch of the Winkler-synthesis gas production.
- 69 Blueprint of drawing M-5030-2 Leuna 1938 - Sketch of the Winkler-synthesis gas production.
- 70 Blueprint of drawing M-5052-2 Leuna 1938 - Sketch of the Winkler-synthesis gas production.
- 71 Colored blueprint of drawing SK-1012 of Building Me 431 showing the Winkler installation at Leuna. Preparation of the dry coal - distribution bunker - Winkler generator - waste heat boiler - dust separators - cooler - disintegrator.
- 72 Small photostat of Winkler generator (1 negative and 1 print).
- 73 Undated blueprint of drawing O240: Preparation of Iso-Octane containing the following sections - Winkler generator, sulphur removal, carbon monoxide conversion, removal of carbon dioxide, isobutyl-synthesis, methanol removal, isobutyl alcohol separation, dehydration to isobutylene, condensation to di- and tri-isobutylene, separation from di- and tri-isobutylene, hydrogenation to iso-octane, dehydration of the higher molecule alcohols to isohexylene and isooheptylene.
- 74 Blueprint of drawing M-2571-1 of February 1939 - Leuna - assembly drawing of the preparation of clay - unloading, drying and reloading.
- 75 Blueprint of drawing 134-4 of BraunkohleBenzin AG (Brabag) of 1935 showing diagram of Winkler generator. Water flow.
- 76 Blueprint of drawing M-11686-2 of October 1943 - Leuna - projected gas cleaning plant for the Winkler generator (assembly).

PART NO. 9  
AVIATION GASOLINE IV

Doc.  
No.

- 1 An 18-page multicopies paper by K. Dehn of I.G. Farbenindustrie AG, Ludwigshafen, of December 1942 titled: "A few requirements for the preparation of fuels for aircraft" with 12 pictures.
- 2 A 3-page typewritten paper of October 1942 - Ludwigshafen. "On the gases of hydrogenation."
- 3 Report #1694 of October 1942 from I.G. Oppau by Dr. Leithe: "Determination of the contents of aromatic, naphthenic, and paraffinic hydrocarbons in gasoline, by means of dispersion, refraction and density" - 9 pages of text, 3 tables, 4 charts.
- 4 A 24-page multicopied paper by K. Dehn of I.G. Farben, of 4 August 1942 titled: "The Development of the aircraft engine" with 16 photographs - Part 1.
- 5 Ditto - Part 2 - 10 pages and 7 photographs.
- 6 A 10-page report by Dr. Nowotny of I.G. Leuna, of March 1944, with 4 graphs: "The catalytic dehydrogenation of propane to propene."
- 7 A 14-page report by Dr. Vogel of IG Oppau titled: "Alkylation with aluminum chloride at low temperatures - Part I-i-Butane and N-Butylane."
- 8 Ditto - Part II - Propylene and i-Butane.
- 9 A 9-page report with 7 pictures on the economic condition of the Alkylation plant, personnel, power requirements. etc.
- 10 Blueprint of drawing 001-1 of January 1941 by Friedrich Uhde at Leuna - Proposed Alkylation plant for a 25,000-ton-per-year production of aviation gasoline
 

13%	-----	60	-----	98°C
		70%	-----	98—120°C
		10%	-----	120—170°C

 Complete flow sheet with quantities, pressures.
- 11 An unidentified flow sheet (letter-size photostat) of the dehydrogenation-alkylation plant (2 copies).
- 12 Blueprint of drawing M4234-1 of May 1941 by Friedrich Uhde, Leuna - Assembly drawing of the Alkylation plant AT-244 for about 48,000 tons per year of air gas - complete flow diagram with quantities, pressures and temperatures (2 copies).
- 13 Letter-size sketch 0/981 Leuna 1940 - Sketch of butane treatment, containing: Isomerization, dehydrogenation, polymerization and hydrogenation, as one method and: Isomerization, dehydrogenation and alkylation as second method.

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- 14 Blueprint of sketch BSK.11 Leuna 1942 - Balance sheet for the alkylation plant with catalytic dehydrogenation; capacity of 5.93 tons per hour coming from the hydrogenation plant.
- 15 A letter-size curve #151243 - Leuna undated - showing relation between the consumption of sulfuric acid in the alkylation process and the temperature of the dehydrogenation showing considerable increase as temperature rises above 590°C (fluegas temperature).
- 16 Letter-size graph #SK101243 - Leuna December 1943 showing relations between the distillation curves and the load in the alkylation process. Constants: Acid concentration at 84-85% and velocity of flow at 120 RPM. Variables=load.
- 17 Photostat of balance sheet P281 Ludwigshafen 1942 for the catalytic dehydrogenation and alkylation.
- 18 Blueprint of drawing M9201-2 Leuna 1941 - Sketch of butane treatment with HCl.
- 19 Blueprint of drawing M-4579-1 Leuna 1941 - Sketch of the alkylation plant in Building Me 1001 with location of valves and instruments.
- 20 Blueprint of drawing M-4507-1 Leuna 1941 - Sketch of the alkylation plant in Buildings Me 1000, 1000a, and 1000ax (2 copies).
- 21 Blueprint of drawing M-11488-2 Leuna April 1943 - Alkylation plant - butane separation Building Me 1002 with location of valves and instruments.
- 22 Blueprint of drawing M-1304-1 Leuna 1936 - Sketch for production of octane with butane - showing: Dehydrogenation; low-pressure gas - washing; oil washing; propylene-butylene-separation; sulfuric acid polymerization; distillation of Di and Tri polymers; cracking of Tri polymers; hydrogenation (2 copies)
- 23 Tracing of drawing 2075-2 from Mineralol-Baugesellschaft, 1937 - Heating furnace for the heating of the catalyvt oven system - at Feitz.
- 24 Blueprint of drawing M3956-1 Leuna 1941 - Sketch of the Alkylation plant for 45,000 tons per year of air gas.
- 25 Blueprint of drawing M8115-2 Leuna 1940 - Proposed alkylation plant for 50,000 t/year production.
- 26 Blueprint of drawing M5481-2 Leuna 1938 - Sketch for gasoline tests - appears to be mostly low-pressure separation of products.
- 27 Blueprint of drawing M6759-4 - Flow sheet of a proposed alkylation plant with quantities left blank.
- 28 Blueprint of drawing M4556-1 Leuna - Sketch of the alkylation plant in Buildings Me 1000, 1000a, and 1000ax (see also Document.19).

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No.

- 29 Blueprint of drawing M4917-1 Leuna 1942 - same as Doc. 19 and 28 - revised.  
 50 Blueprint of drawing M-9405-2 Leuna 1941 - Balance sheet for treatment of butane.

The following sketches of 1941 show three variations in the alkylation process, prepared at Leuna:

- 31 Blueprint of drawing M8791-2 - i-Butane with 13.4% n-Butane.  
 32 Blueprint of M8792-2 - i-Butane without n-Butane.  
 33 Blueprint of M8793-2 - with silver nitrate washing.  
 34 Blueprint of sketch BSK12 Leuna 1942 - Balance sheet for alkylation plant with catalytic dehydrogenation of 5.93-ton-per-hour input.  
 35 Blueprint of sketch BSK 14a Leuna 1942 - Balance sheet of alkylation with chlorine dehydrogenation. Bähr process, capacity 48,900-ton-per-year input.  
 36 Blueprint of sketch BSK 17 Leuna 1942 - Balance sheet of alkylation with chlorine dehydrogenation. M-C-process, capacity 48,900-ton-per-year input.  
 37 Blueprint of drawing M9911-4 Leuna 1944 - Balance sheet for alkylation plant with addition of Fischer gas fuel.  
 38 Blueprint of drawing M-8622-4 Leuna 1942 - Balance sheet for alkylation plant without butylene stabilisation.  
 39 Blueprint of sketch O/909/a Leuna 1940 - Comparison of alkylation with isomerization and T52 process.  
 40 Blueprint of sketch M4151-16 of F. Uhde Leuna 1941 - Sketch of the alkylation process.  
 41 Blueprint of M3893-16 undated, by F. Uhde - Sketch of the alkylation process  
 42 Blueprint of sketch O/1011 of 1940 Leuna - the cracking of the tri-polymers in Building Me-493.  
 43 Blueprint of sketch without number - Leuna 1942 - n-Butane dehydrogenation with chlorine - 1 ton/hour of Butane.

The six following blueprints of letter-size sketches prepared in Leuna in 1942-43 are balance sheets to compare several alkylation processes, as follows:

- 44 BSK35a - Chlorine dehydrogenation, Bähr process without isomerization - input 47,500 tons per year C<sub>4</sub>.



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No.

- 45 BSK37 - The ET-100 plant with chlorine dehydrogenation, M-C process - data taken from Oppau - input 60,000 tons per year C<sub>4</sub>.
- 46 BSK45 - Chlorine dehydrogenation, Bähr process, with isomerization - input 60,000 tons per year C<sub>4</sub>.
- 47 BSK46 - with catalytic dehydrogenation for 60,000-tons-per-year input C<sub>4</sub>.
- 48 BSK51 - with catalytic dehydrogenation for 45,000-tons-per-year input C<sub>4</sub>, as per Dr. Conrad.
- 49 BSK55 - same as Doc. 48 for 60,000-tons-per-year input.

#### PART II

The four following blueprints of drawings were made in 1941 in connection with the Oppanol plant of I.G. Farbenindustrie, Heydebreck:

- 50 BKQA 133-8 - Water separation Building He 539.
- 51 BKQA 134-8 - Butylene distillation Building He 536.
- 52 BKQA 135-8 - Ethylene column and refrigeration plant Buildings He 536 and 537.
- 53 BKQA 136-8 - Polymerization Building He 538.

PART NO. 10  
OXYGEN PLANT

Doc.  
No.

- 1 Report about the explosion of a Linde machine #4 in Building Me 337 at Leuna at 3:40 a.m. on 30 August 1931 and measures proposed to avoid recurrence.
- 2 Instructions for the Linde machines #3 and 4 at Böhlen, for the production of oxygen, dated December 1944 - 16 pages and one colored diagram.
- 3 Report by I.G. Farbenindustrie A.G. Frankfurt am Main dated March 1939 on the supervision of the purity of oxygen and nitrogen produced by the liquefaction of air - 8 pages and 4 charts.
- 4 Blueprint of drawing A-7358 of the MAPAG, Augsburg 1939, showing assembly of a 450 m<sup>3</sup>/m compressor for the oxygen plant #1019 at Böhlen.
- 5 Blueprint of drawing A-3839 (old) of MAPAG, Augsburg, showing relay valve for the starting machine in oxygen plant 1003.
- 6 Blueprint of drawing 47,822 of Linde Ice Machine Co., 1938, showing a water separator for 9400 m<sup>3</sup>/Hr of air at 1 atm. 1500 m/m dia. 2280 m/m high.
- 7 Blueprint of drawing 28-707 of Linde Ice Machine Co., 1939, showing a water separator for 14200 m<sup>3</sup>/Hr of air 1500 m/m dia. 2960 m/m high.
- 8 Blueprint of drawing 29-921 of Linde Ice Machine Co., 1941, Aerolite filter for the oil separator used with the Heylandt expansion machine.
- 9 Sketch of the AST-Böhlen showing belt drive of the expansion machine. The motor pulley is 170 m/m dia. rotates at 1040 RPM; the expander pulley is 1620 m/m dia. (corrugated pulleys).
- 10 Comparison of the Gerlach and Linde processes for the separation of Hydrocarbons gases. Gives flow diagram, engineering and test runs, material balances, individual fraction balances, heat balance, energy requirements, efficiencies, and operating personnel needed.

PART NO. 11  
1ST PART - PHENOL EXTRACTION

Doc.  
 No.

- 1 Photostat on cloth of the Hydrogenation plant at Leuna as of 15 December 1940 showing location of buildings, piping, valves, and measuring instruments.
- 2 Blueprint of drawing M10750-2 Leuna 1942 - Sketch of the Tank farm pumps and pipings at Leuna, particularly covering materials to be shipped to Bruz and Pölitz.
- 3 A group of 3 blueprints of sketches on Phenol Extraction:  
 BSK-80 for 3000 tons input per month for pure phenol  
 BSK-81 for 5000 tons input per month for pure phenol  
 BSK-82 for 3000 tons input per month for raw phenol
- 4 Blueprint of drawing M3924-1 Leuna 1941 - Sketch of the Phenol extraction plant.
- 5 Blueprint of drawing M3989-8 Leuna 1941 - Sketch of the Nitrogen safety lines for the phenol extraction plant.

2ND PART - MISCELLANEOUS

- 6 Tracing of drawing 2030-2, 1937, of BRABAG Pilot plan of the Feitz plant attached to code plan.
- 7 A mimeographed two-page note and two drawings showing pressure-resisting mountings for thermoelements.
- 8 A report by G. CAMPEN of Rheinpreussen dated May 1941 titled: "On the concentration of olefines in Fischer-Tropsch synthetic gasolines" - 17 pages of text, 14 diagrams.
- 9 A report by Göschel of I.G. Farbenindustrie Leuna of 22 February 1937 titled: "Influence of the size of catalyst pellets on the surface of contact, the resistance to flow and the output in the #800 isobutyl oven." 9 pages of text and 13 curves.
- 10 Report of 17 November 1939 titled: "Preparation of the esters of iso-propylalcohol, secondary-butylalcohol and amyl-alcohol, with acetic, propionic and butyric acids." 9 pages of text, 21 figures and 1 tabulation.
- 11 One folder containing letter-size graphs for the calculation of costs, prepared by the I.G. Farbenindustrie AG Leuna in 1943. These graphs cover the following equipment:
  - Steam turbines up to 1500-KW
  - Various metal vessels for pressures up to 30 atm.
  - Slide valves
  - Ceramic circulating pumps

Circulating pumps for acids and special products  
Normal circulating pumps including motors  
Electric motors - up to 1500 KW at 1500 RPM  
Electric motors - up to 250 KW at 3000 RPM  
Flywheel motors including switch and coupling  
Weight of copper and steel in motors up to 1500 KW  
Circulating fans up to 25000 m<sup>3</sup> per hour with 1, 2, or 3 stages  
Turbo-ventilators up to 50000 m<sup>3</sup> per hour and up to 8 stages  
Hot gas ventilators up to 80000 m<sup>3</sup> per hour  
Gasometers with waterseals up to 50000 m<sup>3</sup>  
Special gasometers up to 1500 m<sup>3</sup> capacity  
Piston compressors with drive  
Turbo-compressors up to 60000 m<sup>3</sup> per hour, compression ratio up to 6:1  
Relation between weights and costs of ammonia compressors in connection  
with vaporizing temperature, at constant capacity  
Weights and costs of tray fractionating columns  
Weights and costs of full-body columns  
Vertical firewalls around storage tanks  
Cost of measuring instruments for a distillation column

The following four reports deal with heat transfer and were prepared on the occasion of the Heat convention at Oppau:

- 12 A report of 17 pages and 2 charts, all typed on tracing paper for reproduction dated April 1944 Leuna, titled: "Cases of special economical application of thermopumps in the chemical industry."
- 13 A report of 20 pages, 5 diagrams, and 3 tabulations by Keinke of I.G. Farben Leuna dated January 1944, no title, on special heating processes in connection with the new installation at Leuna, such as:
  - high-pressure steam
  - direct gas heating
  - diphenyl boiler, gas heated
  - compression of steam from 16 atm. up to 25 atm.
  - electrical heating
  - use of the superheat of 16 atm. steam expanded into the low-pressure system
- 14 Notes on heat transfer, photostated, dated 21 August 1942 - 6 pages of calculations and 4 pages of diagrams.
- 15 A 12-page multicopied report by Keinke, dated 1942 - Leuna - titled: "A simple method for the determination of radiation of the walls of heated containers."
- 16 Blueprint of drawing M8469-2 dated 1941 - Sketch of the acetic acid synthesis.
- 17 Blueprint of sketch BSK 67, dated 1943 Leuna - Aviation gasoline plant (AROBIN = aerobenzin).

Doc.

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No.

- 18 Blueprint of drawing M-3636-1 dated Leuna 1940 - Sketch of the OXO-synthesis test plant.
- 19 Blueprint of drawing N9571-2 dated Ludwigshafen 1941, showing the flow diagram of the preparation of gasoline by synthesis from coal and tar capacity of 222-500 tons per year of gasoline and 259,000 tons per year of heating oil.
- 20 Blueprint of drawing N8909-2 dated Ludwigshafen 1943 - flow diagram of the preparation of gasoline by synthesis - from coal and tar - capacity of 222,000 tons per year of gasoline.
- 21 Blueprint of drawing Sch.2018-2 of Blechhammer dated 1942 - flow diagram for the production of gasoline with the DHD process, capacity of 210,000 tons per year of DHD gasoline and 261,000 tons of fuel oil.
- 22 Blueprint, colored, of an unidentified drawing 200/57 of June 1942 (probably Rheinpreussen) showing a catalyst oven plant.
- 23 Blueprint of drawing 45118 of Mannesmann-Witten, dated 1942, showing the cover and connections for an experimental catalyst oven for Rheinpreussen.
- 24 Blueprint of drawing 45099 of Mannesmann-Witten, dated 1941, showing the experimental catalyst oven for Rheinpreussen.
- 25 Tables of specifications of welding rods for various metals under various conditions, put out by "Griesheim Co".

CATALYST PREPARATION AND REGENERATION

Doc.  
No.

- 1 Blueprint of drawing M4238-1 Leuna 1944 - Sketch of a catalyst preparation and regeneration plant in Building Me 971-I (2 copies).
- 2 Tracing of drawing 2223-2 of BRABAG 1937, showing flow-balance sheet for the regeneration of two tons of catalyst per 24 hours.
- 3 Blueprint of drawing M4628-1 Leuna 1941, showing the preparation of artificial catalyst and reduction plant in Building Me 971-I for 12 tons per month. Pencil note on reverse says T-52 and AT catalyst (2 copies).
- 4 Blueprint of drawing M7821-2 Leuna 1940 - flow diagram for catalyst plant in Me 971 (2 copies).
- 5 Blueprint of drawing M7913-4 Leuna 1942, showing the proposed extension of the existing catalyst plant.
- 6 Blueprint of M9062-4 Leuna 1943 - block diagram for the preparation of 40 tons per month of H.F. catalyst and 80 tons per month of AT catalyst in Buildings 971 and 998 Leuna.
- 7 Photostat of sketch OS-178 of 1943 showing three details of the catalyst oven: (1) the catalyst distributor, (2) the catalyst outlet, and (3) the flue gas distributor.
- 8 Blueprint of drawing O/7321 of 1938 showing preparation of catalyst #5058 (3 copies).
- 9 Blueprint of drawing M3515-1 Leuna 1940 - flow diagram for preparation of H.F. catalyst, showing sequence of 74 pieces of equipment with drawing numbers.
- 10 Blueprint of drawing M8183-2 Leuna 1941, showing the flow diagram of catalyst preparation - Molybdenum Iron-base - for Building Me 882.
- 11 Blueprint of letter-size sheet M4739-16 Leuna 1942 showing modification in catalyst plant Building Me 22d with pencil notes on reverse side.
- 12 Ditto - with colored lines.
- 13 Photostat of letter-size sketch O/7322 Leuna 1938 of catalyst preparation plant with pencil changes.
- 14 Blueprint of sketch M2089-16 Leuna 1937 - situation of the catalytic plant, Building Me 22b by the end of 1937 (see Doc. 13) - input is "Rotsalz" and white lime.
- 15 Photostat of sketch of 1940 showing flow diagram for catalyst II preparation in Building Me 971 at Leuna, with phosphoric acid  $H_3PO_4$ .

Doc  
No.

- 16 Blueprint of sketch of 1940 Leuna showing location and name of equipment on platforms I to V in Building 971 for catalyst II preparation.
- 17 Photostat of sketch of 1940 showing flow diagram for preparation of catalyst I in Building Me 971 at Leuna with nitric acid and chrome oxide  $CrO_3$ .
- 18 Photostat of sketch O/1540 of 1942, showing continuous preparation of catalyst #5058, tungsten base, pencil notes on reverse side.
- 19 Blueprint of drawing 4882/210 Leuna 1939 - flow diagram for catalyst preparation in Building 210, with pencil notes and revisions of piping sizes.
- 20 Blueprint of drawing M7357-2 Leuna 1940 - flow diagram for the preparation of Hy-catalyst showing dimensions of equipment.
- 21 Blueprint of drawing M3002-8 Leuna 1940 - flow diagram and relative position of equipment for preparation of catalyst II in Building Me 971, Leuna, capacity of 190 tons per year of catalyst, showing details of operation equipment 41 to #50.
- 22 Blueprint of drawing M5504-1 Leuna 1943 - flow diagram for catalyst preparation plant proposed for BRUX plant.
- 23 Blueprint of drawing M7461-2 Leuna 1940 - flow diagrams showing preparation of catalyst and output from Winkler plant - dryers - mills and bunkers - for Brux plant.
- 24 Blueprint of drawing M3402-1 Leuna 1940 - producer gas regenerator, drawing superseded by M3766-1.
- 25 Blueprint of M3916-1 Leuna 1941 - showing proposed extension of contact preparation plant in Building 882 at Leuna.
- 26 Blueprint of drawing M3461-2 Leuna 1937 - diagram of the preparation plant for catalyst 6439 showing location of equipment in Building Me 22b.
- 27 Blueprint of M7465-2 Leuna 1940 - material balance with indication of drawing numbers for preparation of catalyst #6719 and 6434 (2 copies).
- 28 Blueprint of sketch O/142 Leuna 1934 - Sketch of sprayers and washers in Building Me 22d at Leuna.

CATALYST PREPARATION AND REGENERATION

Doc.  
No.

- 1 Blueprint of drawing M4258-1 Leuna 1944 - Sketch of a catalyst preparation and regeneration plant in Building Me 971-I (2 copies)
- 2 Tracing of drawing 2225-2 of BRABAG 1937, showing flow-balance sheet for the regeneration of two tons of catalyst per 24 hours.
- 3 Blueprint of drawing M4628-1 Leuna 1941, showing the preparation of artificial catalyst and reduction plant in Building Me 971-I for 12 tons per month. Pencil note on reverse says T-52 and AT catalyst (2 copies).
- 4 Blueprint of drawing M7821-2 Leuna 1940 - flow diagram for catalyst plant in Me 971 (2 copies)
- 5 Blueprint of drawing M7913-4 Leuna 1942, showing the proposed extension of the existing catalyst plant.
- 6 Blueprint of M9062-4 Leuna 1943 - block diagram for the preparation of 40 tons per month of H.F. catalyst and 80 tons per month of AT catalyst in Buildings 971 and 998 Leuna.
- 7 Photostat of sketch OS-178 of 1943 showing three details of the catalyst oven: (1) the catalyst distributor, (2) the catalyst outlet, and (3) the flue gas distributor.
- 8 Blueprint of drawing O/7321 of 1938 showing preparation of catalyst #5058 (3 copies).
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- 10 Blueprint of drawing M8183-2 Leuna 1941, showing the flow diagram of catalyst preparation - Molybdenum Iron base - for Building Me 882.
- 11 Blueprint of letter-size sheet M4739-16 Leuna 1942 showing modification in catalyst plant Building Me 22d with pencil notes on reverse side.
- 12 Ditto - with colored lines.
- 13 Photostat of letter-size sketch O/7322 Leuna 1938 of catalyst preparation plant with pencil changes.
- 14 Blueprint of sketch M2089-16 Leuna 1937 - situation of the catalytic plant, Building Me 22b by the end of 1937 (see Doc. 13) - input is "Rotsalz" and white lime.
- 15 Photostat of sketch of 1940 showing flow diagram for catalyst II preparation in Building Me 971 at Leuna, with phosphoric acid  $H_3PO_4$ .



Doc.  
No.

- 16 Blueprint of sketch of 1940 Leuna showing location and name of equipment on platforms I to V in Building 971 for catalyst II preparation.
- 17 Photostat of sketch of 1940 showing flow diagram for preparation of catalyst I in Building Me 971 at Leuna with nitric acid and chrome oxide  $\text{CrO}_3$ .
- 18 Photostat of sketch O/1540 of 1942, showing continuous preparation of catalyst #5058, tungsten base, pencil notes on reverse side.
- 19 Blueprint of drawing 4882/210 Leuna 1939 - flow diagram for catalyst preparation in Building 210, with pencil notes and revisions of piping sizes.
- 20 Blueprint of drawing M7337-2 Leuna 1940 - flow diagram for the preparation of Hy-catalyst showing dimensions of equipment.
- 21 Blueprint of drawing M3002-8 Leuna 1940 - flow diagram and relative position of equipment for preparation of catalyst II in Building Me 971, Leuna, capacity of 190 tons per year of catalyst, showing details of operation equipment 41 to #50.
- 22 Blueprint of drawing M5504-1 Leuna 1943 - flow diagram for catalyst preparation plant proposed for BRUX plant.
- 23 Blueprint of drawing M7461-2 Leuna 1940 - flow diagrams showing preparation of catalyst and output from Winkler plant - dryers - mills and bunkers - for BRUX plant.
- 24 Blueprint of drawing M3402-1 Leuna 1940 - producer gas regenerator, drawing superseded by M3766-1.
- 25 Blueprint of M3916-1 Leuna 1941 - showing proposed extension of contact preparation plant in Building 882 at Leuna.
- 26 Blueprint of drawing M3461-2 Leuna 1937 - diagram of the preparation plant for catalyst 6439 showing location of equipment in Building Me 22f
- 27 Blueprint of M7465-2 Leuna 1940 - material balance with indication of drawing numbers for preparation of catalyst #6719 and 6434 (2 copies).
- 28 Blueprint of sketch O/142 Leuna 1934 - Sketch of sprayers and washers in Building Me 22d at Leuna.

FLOW DIAGRAMS OF VARIOUS PROCESSES  
AND MISCELLANEOUS DATA

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- 1 A 133-page mimeographed volume describing patents concerning fifteen various subjects related to the chemical industry, from about 225 companies and individuals from all over the world. Patents cited go as late as 1939. Book must have been prepared around 1940. The work is chiefly concerned with ammonium sulfate production, recovery, treatment, crystallization, etc.
- 2 Blueprint of drawing M-3369-1 Leuna 1940 - flow diagram of the K.W.Sy experimental unit, showing two stages of synthesis ovens, production of gasoline and gasoil, product going to OKOplant. This is probably a synol synthesis process.
- 3 Blueprint of drawing M10861-2, unidentified, undated - sketch of the proposed ammonia-water treatment plant.
- 4 Blueprint of drawing M-9804-2 Leuna-1942 - diagram of a plant in Me 994 for the production of pyrocatechin with location of 20 pieces of equipment and indication of detail drawings.
- 5 Blueprint of M-6082-2 Leuna 1942 - new construction in Building Me 267. Diagram of the oven group and the absorption plant for the production of 25 tons per day of Nitrogen in NH<sub>3</sub>, with list of equipment, supplies, and drawing numbers.
- 6 Blueprint of drawing M-3647-1 Leuna 1940 - flow diagram of a process. unidentified, which seems to be preparation of aldehydes.
- 7 Blueprint of drawing M-1857-1 Leuna 1937 - Block diagram of the preparation of ammonium phosphate with calcium phosphate and carbonate residues
- 8 Blueprint of drawing O.A.SK1 Leuna 1942 - Present method for the preparation of pure methanol from raw methanol containing ether - flow diagrams
- 9 Blueprint of drawing M-4735-1 Leuna 1941 - Cyclohexanol plant in Building Me 978 - diagram for the monthly production of 1550 tons of cyclohexanol showing 30 pieces of equipment, flow diagrams, sizes, capacities, and detail drawing numbers, and location of measuring instruments.
- 10 Blueprint of drawing M4687-1, 1941 - sketch of the Mersol plant at Moosbierbaum (synthetic soap) showing extraction, hydrogenation, acid wash, sulfochlorination, HCl absorption, saponification and dechlorination of the residue oil.
- 11 Blueprint of drawing M10811-2 Leuna 1942 - Sketch of the H<sub>2</sub>S preparation in Building Me 386 and treatment of the ammonia water as of 18 December 1942.
- 12 Blueprint of drawing M2908-1 Leuna 1934 - Sketch of the sulfo-chloride plant in Building Me 947 including saponification giving description of 20 pieces of equipment.

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- 13 Blueprint of drawing M-5396-1 Leuna 1943 - Carbondioxyde plant in Building Me 9241 - Sketch showing flow diagram, equipment, measuring instruments, piping, detail drawing numbers, for a monthly production of 350 tons of CO<sub>2</sub>.
- 14 Blueprint of drawing M-3502-1 Leuna 1940 - flow sheet for the preparation of LURAN in Building Me 979. This sketch is intended to be colored, is therefore quite difficult to follow without the colors.
- 15 A 2-page report of 31 May 1943, Leuna, reporting a test of a combination of silicon tetrachloride and ammonia for production of smokescreens with 7 photographs, also 1 dozen of photographs related to smokescreen production. Results were negative.
- 16 Report #441 of I.G. Farben Leuna dated February 1944 by Dr. Geib: "Theory of the formation of formaldehyde by catalytic oxydation of methane with ozone and oxygen" - 7 pages.
- 17 Four typewritten sheets of calculation, and blueprint of sketch BSK 64 attached, dated Leuna April 1943 - on the preparation of a solution of SO<sub>3</sub> HCl + SO<sub>3</sub> called N-solution for 10 tons per day - process can be followed on flow sheet.
- 18 Blueprint of sketch BSK 64a of Leuna showing flow sheet of production of 10 tons of N-solution per day - somewhat different from BSK 64 attached to document 17. This sketch gives quantities per hour. Five sheets of analyses are attached, for sulfochloric acid oxygen, sulfur dioxyde, rhomboid sulfur, and sulfur trioxyde.
- 19 Blueprint of drawing M5334-1 Leuna 1943 - flow sheet for the preparation of methyl adipic acid in Building Me 1018 describing 51 pieces of equipment with capacities.
- 20 Blueprint of drawing M1695-8 Leuna 1938 - Sketch of the second hydrogenation for Chamber #7 in Building Me 13.
- 21 Photostat of drawing BSK 53 Leuna 1943, showing diagram of the plant for LEUTOL II Production of 1000 Kg per hour of pure Toluol.
- 22 Blueprint of drawing M4807-1 Leuna 1942 - Flow diagram of the preparation of 50,000 tons per year of Mersolat (synthetic soap). Saponification with NaOH at 5% and Mersol H.
- 23 Blueprint of drawing M2670-1 Leuna 1939 - Flow sheet for the production of acetone from propylene, capacity of 2000 tons per year of acetone.
- 24 Blueprint of drawing M-1301-1 Leuna 1936 - Flow sheet of the regeneration of catalyst, the nitrate plant and the mercury separation, for the acetic aldehyde plant.
- 25 Blueprint of letter-size drawing M4025-16 Leuna 1941 - Block diagram of the synol plant for 10000 tons per year.

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- 26 Blueprint of drawing M-5933-4 Leuna 1940 - flow sheet of an unidentified process.
- 27 Blueprint of drawing M-4728-1 Leuna 1941 - flow sheet of the distillation process of the synol plant at Leuna, for 10000 tons per year production using distillation oil and gasoil, plus  $\text{CO}_2$   $\text{CO}_3\text{Na}_2$  solution and NaOH solution and obtaining paraffins. synol-alcohol fractionator in 4 cuts from  $160^\circ$  to  $370^\circ$  centigrade.
- 28 Blueprint of drawing M9629-2 Leuna 1941 - flow sheet of an isomerization process for 12000 tons per year of iso-products for alkylation.
- 29 Blueprint of M5142-1 Leuna 1942 - flow sheet of the isomerization plant Building Me 1005 - supersedes M-5018-1.
- 30 Blueprint of M8693-4 Leuna 1942 - balance sheet of the isomerization plant in Building Me 1005 at Leuna (quantities given per hour).
- 31 Blueprint of drawing M4799-1 Leuna 1942 - flow sheet for the treatment of the synol-products in Building Me 458. This is continuation of Doc. #27. It shows esterification, saponification, crystallization - with list of 50 pieces of equipment and detail drawing numbers.
- 32 Large graph dated 1941 Schfölvén-Equilibrium curves between vapor and liquid for a vapor pressure relation  $\frac{p_l}{p_s} = \alpha$  of  $1 \div 4.5$ .

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MISCELLANEOUS FLOW SHEETSDoc.  
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- 1 Blueprint of drawing M5855-4 Leuna 1940, showing detail of construction of Thermoelements and location of those in bundles of tubes.
- 2 Blueprint of drawing M7658-2 Leuna 1940 - preliminary sketch of an acetic acid plant for 300 tons per month.
- 3 Blueprint of drawing M3708-1 Leuna 1940 - flow sheet for the preparation of 30 tons per month of hexamethylene diamine - experimental plant
- 4 Blueprint of drawing M-4242-1 Leuna 1941 - flow sheet for the preparation of 250 tons per year of adipic acid, describing 33 pieces of equipment
- 5 Blueprint of drawing M1394-2 Leuna 1935 - Plant for the preparation of chlorhydrine and ethylene oxyde, actual location of equipment.
- 6 Blueprint of drawing M7072-2 Leuna 1940 - Flow diagram of an unidentified process.
- 7 Blueprint of drawing M4974-2 Leuna 1938 - installation of the 2000 atm. NBS plant in Building Me 107.
- 8 Blueprint of drawing M8726-2 Leuna 1941 - sketch of the carbon dioxide plant at atmospheric pressure in Building Me 494.
- 9 Blueprint of drawing M4285-2 Leuna 1939 - installation of the aldehyde storage plant, with filling device and safety features.
- 10 Blueprint of drawing M5355-2 Leuna 1938 - flow diagram of a proposed plant for 20 tons per month of hydroxylamine-sulfate and oxime. Description of 14 pieces of equipment.
- 11 Blueprint of drawing M8508-2 Leuna 1941 - Sketch of the acetic acid preparation in Building Me 238 at 700 atm. pressure 380° C temperature, from methanol and CO.
- 12 Blueprint of drawing M-10748-2 Leuna 1942 - diagram of the recovery of acetone from gasoline in Building Me 888 (very sketchy).
- 13 Blueprint of drawing M-1370-1 Leuna 1937 - Assembly drawing of the methanol oven, 8<sup>m</sup> long, with 3 connections for cold gas - catalyst capacity : 670 liters.
- 14 Blueprint of drawing M1416-2 Leuna 1936 (see Doc. #5) - flow sheet for the preparation of chlorhydrine and ethylene oxyde.
- 15 Blueprint of drawing M7259-2 Leuna 1940 - flow sheet of the bisulfite cleaning plant, Building Me 975, capacity of 150 tons per month.

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- 16 Blueprint of drawing M8329-2 Leuna 1941 - flow diagram of the experimental acetic acid plant Building 238.
- 17 Letter-size blueprint of M4595-16 Leuna 1942 - flow sheet of an experimental installation for the preparation of lacquer in Building Me 417.
- 18 Photostat of sketch OS-182 - diagram of a trimethylolethane plant, Leuna 1942.
- 19 Typewritten note on the cleaning of pentaerythrite of 1940.
- 20 Copy of a typewritten sheet dated Leuna April 1942 showing diagram and balance and analysis of preparation of propanol based on methane transformation into ethylene and ethane (oxosynthese) from hydrogenation exhaust gases at Leuna.
- 21 Paper by Dr. Delfs, of IG Leverkusen, dated 13 October 1941 on "The Polymerization of tetrahydrofurane" - 22 pages.
- 22 Blueprint of drawing M1410-4 Leuna 1935 - Flow diagram of the propane and the oxygen for an ethylene oven.
- 25 Blueprint of drawing M7535-2 Leuna 1940 - Sketch of the preparation plant for calcium nitrite solution in Building Me 275/276 showing the driving mechanism for the automatic two-way valve.
- 24 Blueprint of drawing M4250-1 Leuna 1941 - flow diagram of the preparation of an artificial catalyst in Building Me 971.
- 25 Blueprint of drawing M-4494-1 Leuna 1941 - diagram for the preparation of propionic aldehyde from propanol and air, capacity 350 tons per month. Reaction:  $C_3H_7OH + \frac{1}{2} O_2 = C_3H_6O + H_2O$  showing description, sizes, material, capacities and drawing numbers of 103 pieces of equipment.
- 26 Blueprint of drawing M4352-1 Leuna 1941 - Sketch of an acetic acid purification plant for 1200 tons per month (2 copies).
- 27 Blueprint of drawing M3530-8 Leuna 1941 - Sketch of the decrystallisation of  $P_5$  in Building Me 981.
- 28 Blueprint of drawing M5296-8 of October 1938 Leuna - Sketch of the preparation of pure Butadiene from butane and chlorine, showing chlorination oven - mmo cracking - cold chlorination - Tri and Di-cracking - washing - then washing of the HCl and HCl electolysis for return of Cl to process.
- 29 Blueprint of drawing M-3652-1 Leuna 1940 (see Doc. #25) - flow diagram of the preparation of propionic acid from propionic aldehyde and oxygen in Building Me 981.
- 30 Blueprint of drawing M5204-2 Leuna 1938 - flow sheet of Deacon process in Building Me 244 (chlorine).

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- 31 Blueprint of drawing M3419-1 Leuna 1940 - flow sheet of the P<sub>3</sub> plant in Building Me 981 (see Doc. #27). Charge: Propionic aldehyde, formaldehyde, NaOH Result: P<sub>3</sub> and sodium formate.
- 32 Blueprint of Sketch M4485-2 Leuna 1938 - Sketch of the preparation of ethylene from Kogasin II (all in German script).
- 33 Blueprint of drawing M4573-1 Leuna 1941 - diagram for the preparation of formaldehyde from methanol and air, capacity - 360 tons per month. Reaction:  $\text{CH}_3\text{OH} + \frac{1}{2}\text{O}_2 = \text{CH}_2\text{O} + \text{H}_2\text{O}$  showing description, sizes, materials, capacities, and drawing numbers of 50 pieces of equipment (compare to document #25).
- 34 Blueprint of drawing M7872-2 Leuna 1940 - flow diagram for the enlargement of the distillation plant in Building Me 490 for alcohol synthesis.
- 35 Blueprint of drawing M9994-2 Leuna 1942 - diagram for the preparation of carbon dioxide at atmospheric pressure.
- 36 Blueprint of drawing M4581-1 Leuna 1941. Large diagram being part of a group including drawings M3391-1, M3392-1 (for HOKO acid plant) and M-2983-1, M-2984-1 (for nitric acid plant) and M-6082-2, with description of equipment, parts in German script - process not identified (2 copies).