23500 — 25133

23501

LISTING OF GERMAN TECHNICAL DOCUMENTS BY TITLE AND BRIEF ABSTRACT
BOX II

Item No.

1 Calculations and construction of High Pressure Synthesis Reaction Chambers with Cooling System Similar to Steam Boilers.
A 46-page report by Dr. Wirth, Leuna Works, July 27, 1944, including description of apparatus, photographs, curves, calculations, operating conditions of the experiments, and literature references. A study of heat transfer from catalysts such as are used in the synthesis of methanol.

2 Calculations and Estimates of a reaction chamber for catalystic exothermic and endothermic reactions which take place within narrow temperature ranges.
A 29-page report by Dr. Wirth, Leuna Works, July 4, 1942, including photographs of reaction tubes, flow diagrams, data curves, and formulas. Gives details of apparatus, location of catalyst, and comparisons of several processes.

3 Graphical illustration of the mixed gas recoverable from oxygen, steam, and carbon. (Incorporated into the Appendix of the Navy Technical Report on Partial Combustion of Methane).

4 Report on the Catalytic Cracking Pilot Plant building Me 56 at Leuna Works (Ammoniak Werk Merseberg - I.G. Farben).
A 17-page report by Dr. Pobloth describing the pilot plant for production of Benzin from middle oil by catalytic cracking in gaseous phase over a solid catalyst. Includes photographs of reactors and other equipment, and flow diagrams of process.

5 Experiments and theory of regeneration of catalysts used in the Schleus catalytic cracking processes.
A 33-page report by Dr. Otto, Leuna Works, August 1, 1943, 20 data curves, and 10 figures showing apparatus.

6 Reaction velocity of CO in Brown oxide (iron oxide) contact at high pressures.
(Incorporated into the Appendix of the Navy Technical Report on Gas Purification).

Item No.

7 Determination of the heat of evaporation of inorganic and organic materials.
4-pages and 2 graphs from Leuna Works, April 2, 1942 (Signature illegible).

8 Steam consumption of pressure conversion.
A 10-page report plus 14 figures of flow sheets and data curves by Dr. Sabel of Leuna Works, Dec. 14, 1940, discussing the savings in steam of conversion at 26 atm in contrast to one at atmospheric pressure in respect of operating yields and theoretical considerations.

9A Thermal Pumps. Three reports entitled, "A thermal pump with good technical efficiency" (4 pages) April 5, 1944; "Thermal Pumps" (4 pages and 8 figures of apparatus and data curves) April 1, 1943; and "Efficiency of thermal pumps in rectification" (8 pages and 11 figures of apparatus and data curves), March 15, 1943. Ammoniakwerke Merseburg, Leuna Works.

9B Heating Problems in the sump phase with special consideration to thermal pumps.
A 13-page report and 20 figures of apparatus, flow diagrams, and data curves, Mar. 22, 1944. I.G. Farbenindustrie, Ludwigshafen.

10 Experiments to determine the amount of packing in high pressure ovens.
A 19-page report by Dr. Amon of Ammoniakwerke Merseburg, Dec. 15, 1933, covering research on gas liquid volumes in tubes. Includes numerous graphs and drawings of apparatus.

11 The present status of research work on distillation and rectification at Bitterfeld.
A 21-page report and 18 drawings of apparatus, I.G. Farbenindustrie, April 1942. (Signature illegible).

12 Investigations on pressure drop and load limit in trays of rectification columns.
12 pages and 16 figures of apparatus, flow diagrams, and data curves.

13 Results of experiments on measurement of liquid distribution in columns packed with Raschig rings.
9 pages, 7 tables, and 6 data curves. Ammoniakwerke Merseburg, Feb. 13, 1939.

14 Further investigations on the trays for the N-1-butane column.
2 page report on results of investigation, photographs of apparatus, and one curve on pressure loss.

Item No.

15 Azeatropic distillation.
9-page report and six drawings and data curves, by Dr. U. "eber. Report not dated but the drawings are dated Januarv. 1944. Buna-Werke G.m.b.H.

16 Results of experiments on the Firma Borsig Distillation column.
13-pages of description of apparatus and process, photographs of apparatus, and data curves. Dr. Wirth, Leuna Works, Oct. 15, 1941. (2 copies of report).

17 Results of experiments on two 400-mm n-l-butane columns of alkylation apparatus made for Heckmann & Langin G.m.b.H.
2 pages and 1 curve, Leuna Works, Oct. 9, 1942.

18 Development of a tray for flow of large amounts of liquid.
A 34-page report by Dr. Wirth of Leuna Works, Jan. 19, 1942, including description of experiments, photographs of apparatus, and data curves. (2 copies of report)

19 Calculation of pressure loss in bubble-cap trays.
41-page report by Dr. Sigwart including numerous curves. Dec. 29, 1938.

20 Efficiency of thermal pumps in rectification.

8 pages of theory and description of a plant for the recovery of propylene from mixtures of propylene and propane; and 8 pages of data curves. Dr. Orlicek, Leuna Works, March 15, 1943.

21 Report on the efficiency of the "Bitterfelder" rectification column in comparison to other columns.
A 16-page report including data curves, and photographs of apparatus, by Dr. Eberhardt, February 1944

22 The influence of the direction of flow and the separation of liquid on column trays.
A 29-page paper including discussions of several processes, photographs of apparatus, flow diagrams, and data curves, presented by Dr. Röcke at the meeting of superintendents at Bitterfeld on April 28, 1941.

23 Investigations and operation of condensers
A 24-page report by Dr. Wirth, Leuna Works, Jan. 24, 1942, including photographs showing condition of apparatus after several months operation.

| Item No. | |
|---|---|
| 24 | Duplicate copy of Item No. 12 above. |
| 25 | Abstract of a report by Dr. Sigwart on pressure loss in bubble cap trays.<br>3 pages including 2 curves. |
| 26 | Report on tests on bubble cap trays of rectification columns.<br>14 pages including description of experiments, drawings illustrating the apparatus, and data curves. |
| 27 | The use of a waste gas turbine for production of heat in the central German bituminous coal district.<br>A 32-page report by Dr. Fri., Leuna Works, Nov. 18, 1943, including description of process and flow diagrams. |
| 28 | Investigations on Fischer-Tropsch synthesis with cobalt and nickel precipitated catalysts in Laboratory Merseburg. No. 2.<br>A 40-page report by Dr. Zerrweck, Leuna Works, Sept. 12, 1939, covering reports of laboratory experiments on Fischer-Tropsch synthesis. Includes an appendix of numerous curves and tables. |
| 29 | Report of experiments on recycling the tail gas in gasoline synthesis. March 13 to April 24, 1939.<br>A 13-page report including tables and flow diagrams. Not signed. |
| 30 | Flow diagram of the motor fuel plant of Hoesch-Benzin G.m.b.H. at Dortmund. May 23, 1945. |
| 31 | Flow diagram of a hydrocarbon synthesis plant. M 3369-1. Ammoniakwerke Merseburg, May 30, 1940. |
| 32 | Flow diagram of the I. G. process for catalytic polymerization of Fischer "Gasol" ($C_2 H_4 + C_3 H_6 + C_4 H_8 + C_2 H_6 + C_3 H_8 + C_4 H_{10}$) |
| 33 | Three photostatic copies of a flow diagram of the Fischer-Tropsch process for production of gasoline from CO and H2. Undated and unidentified. |
| 34 | Flow sheet of Example No. 1 for a process for recovery of pure aromatic hydrocarbons from gas mixtures. O/1401. Oct. 10, 1943. Ammoniakwerke Merseburg. |
| 35A | Flow sheet of a proposed "Brux" pressure converter according to tests made at Oppau. M 3013-6. June 29, 1939. |

| Item No. | |
|---|---|
| 35B | Flow sheet of a hydrocarbon synthesis plant M 3328-7. May 5, 1940. (Unlabeled) |
| 36 | Eight evaluations and one complete report on the pilot plant experiment No. R.A.V. for the year 1943. Includes operating conditions, apparatus, (I.G.) catalyst, volume of gas treated, analysis of initial gas and synthesis gas, production figures of finished products, conversion yields. and analyses of finished product. |
| 37 | General arrangement of a Fischer-Tropsch plant. Lurgi Gesell. DS-18. Undated. |
| 38A | Table of amounts of oven gas, water gas, synthesis gas, residue gas, and city gas produced in 24 hours, as well as analyses of each gas. May 30, 1945. No identification as to location. |
| 38B | Flow diagram showing production figures and process for recovering toluene and benzene from "Witol" by dealkylation. Ammoniakwerke Merseburg, Jan. 14, 1943. |
| 39 | Flow sheet of an experimental plant for continuous azeatropic distillation light oil extract with methanol, M 5250-16, May 18, 1943. Ammoniakwerke Merseburg. |
| 40 | References to discussions at a conference at Ludwigshafen in November 1938 on the status of hydrocarbon synthesis. 18 pages including tables, curves, flow diagrams, comparison of various processes, and a plan layout showing the location of various buildings at Merseburg. |
| 41 | Drawing comparing eight processes for production of synthesis gas ($H_2:CO = 1:2$). ODS/567, Lurgi Gesell. für Warmetechnik m.b.H. Gives brief flow sheet, gas analyses, amounts of primary products used, production figures for synthesis gas, and construction costs of plants. |
| 42 | Detailed drawing of item 9480, contact oven tube. Order No. 129575. Drawing 2JZ 665/8. Undated. |

Item No.

43 A 2-page memorandum briefly listing the subjects to be discussed at a meeting with Ruhrchemie on Jan 4, 1939 on Fischer-Tropsch synthesis. Three sketches included (1 flow diagram and 2 piping diagrams of oven). Leuna Works, Jan. 2, 1939.

44 Report on Leuna Werke's hydrocarbon synthesis experiment at Ludwigshafen on Nov. 3, 1938.
A 4-page report by Dr. Sabel, Leuna Works, Nov. 10, 1938 describing conditions of experiment and products obtained.

45 German translation of a report by Standard on the economy of the Fischer process, of Feb. 8, 1939. 10 pages & 6 tables

46 Flow diagram of a Lurgi medium pressure process for synthesis of hydrocarbons. 20 atm. pressure. Includes production figures, operating conditions, gas analyses, and composition of liquid products

47 Memorandum on investment and operating cost for Fischer pilot unit studies at Baton Rouge, and synthesis gas regenerator studies at Baton Rouge. 7-page memorandum by W. G. Scharmann of Oct. 5, 1939. In English.

48 German translation of a report by Standard of Feb. 9, 1939 on Examination of the Investigation by M. W. Kellog on the Fischer Process". 19 pages including tables and flow diagrams.

49 Papers given at a meeting at Ludwigshafen in Nov. 1938 on synthesis of hydrocarbons and production of synthesis gas. Includes 11 papers, 39 pages, & flow diagrams of plants at Holten (Two copies of report). The subjects covered are:

1. Details of the process and results obtained with different catalysts.
2. Removal of organix sulfur from synthesis gas.
3. Manufacture and regeneration of catalysts.
4. Laboratory experiments on various catalysts.
5. Description of Winkler and Kellogg processes.
6. Cracking hydrogenation residue gas in cowper stoves.
7. Methane cracking.

Item No.

50A Pocket handbook of processes, equipment layout, flow diagrams, and building layouts of the Ammoniakwerke Merseburg, Magdeburg. Building 57 and buildings 1 to 17 as follows:

| Page | | | |
|---|---|---|---|
| 1 | Bldg. | 57 | Char storage. Plan layout |
| 2 | " | 57 | Flow diagram. |
| 3-4 | " | 57 | List of equipment. |
| 5 | " | 1 | Oxygen plant. Plan layout |
| 6-8 | " | 1 | List of equipment. |
| 9 | " | 2 | Oxygen gas tank |
| 10 | " | 3 | Winkler water gas plant |
| 11 | " | 3 | Flow diagram of Winkler plant. |
| 12 | " | 3 | Flow diagram of the feed water treatment and evaporation plant. |
| 13-17 | " | 3 | Equipment |
| 18 | " | 4 | Water gas receiver. |
| 19 | " | 6 | Desulfurization of water gas. |
| 20 | " | 6 | Cross section through desulfurization plant. |
| 21-22 | " | 6 | List of equipment |
| 23 | " | 7 | Hydrogen Contact plant. |
| 24- 26 | " | 7 | List of equipment |
| 27 | " | 8 | Contact gas receiver |
| 28 | " | 9 | Gas compressors; CO & $CO_2$ purification |
| 29 | " | 9 | CO purification. |
| 30-34 | " | 9 | List of equipment |
| 35 | " | 9 | Ammonia recovery |
| 36 | " | 10 | $CO_2$ receiver |
| 37 | " | 11 | Gas circulation pumps & compressors |
| 38-42 | " | 11 | List of equipment |
| 43 | " | 11a | Contact mixing plant & oil regeneration plan layout. |
| 44 | " | 11a | Wash oil regeneration (vacuum plant) flow diagram. |
| 45 | " | 11a | Flow diagram of contact mixing. |
| 46 | " | 11a | Flow diagram of high pressure recycle gas Tar - and benzine-phase. |
| 47-50 | " | 11a | List of equipment. |
| 51 | " | 11b | Plan layout. Plants for expansion & freeing from slime. |
| 52 | " | 11b | Flow diagram. |
| 53 | " | 11b | List of equipment. |
| 54 | " | 12 | Alkazid plant. |
| 54 | " | 13 | Claus plant |
| 54 | " | 51 | Blowers |
| 55 | " | 12 | Flow diagram of the Alkazid plant. |
| 56-57 | " | 12 | List of equipment for Alkazid plant. |
| 58 | " | 13 | Flow diagram of Claus plant |
| 58 | " | 51 | Flow diagram of blowers |
| 59 | " | 14 | Hydrogen sulfide gas receiver. |
| 60 | " | 15 | Phenol water - Purification & dephenolization plant. |
| 61 | " | 16 | Tar extractors. Plan layout |

Item No.

50A cont'd

| Page | | | |
|---|---|---|---|
| 62 | Bldg | 16 | Tar extractors. Flow diagram. |
| 63 | " | 16 | Tar extractors oil plant. |
| 64-66 | " | 16 | List of equipment. |
| 67 | " | 17 | Tar storage tanks. |
| 68-69 | " | 17 | List of equipment. |

50B Pocket handbook of processes, equipment layout, flow diagrams, and building layouts of the Ammoniakwerke Merseburg, Buildings 18-56. Magdeburg as follows:

| Page | Bldg. | |
|---|---|---|
| 1 | 18-19 | Bldg. Plan layout of the benzene chamber (Bldg. 19) and Sump chamber (Bldg. 18) |
| 1a | 18 | Equipment layout |
| 2 | 18 | Flow diagram of tar chamber. |
| 3-4 | 18 | List of equipment. |
| 4-5 | 19 | Equipment layout |
| 6 | 19 | Flow diagram of Benzin chamber. |
| 7-8 | 19 | List of equipment. |
| 9 | 20,21,22 | Intermediate storage tank. |
| 10 | 20,21,22 | Suction pipes. Intermediate storage tanks. |
| 11 | 20,21,22 | Pressure lines. |
| 12 | 20,21,22 | Plan layout |
| 13 | 20,21,22 | List of equipment. |
| 14 | 21 | Plan layout - Pumps |
| 15 | 21 a | Gas scrubber - Flow diagram. |
| 16 | 21a | Gas scrubber - Flow diagram. |
| 17-19 | 21 | List of equipment |
| 20 | 23 | Plant A - Flow Diagram |
| 21 | 23 | Plant B - Flow Diagram |
| 22 | 23 | Plant B2 - Flow Diagram |
| 23-27 | 23 | List of equipment |
| 28 | 25 | Fuel gas plant. Plan layout |
| 29-31 | 25 | List of equipment |
| 32 | 26 | Hydrogenation gas tank. |
| 33 | 27 | Producer gas tank. |
| 34 | 28 | Benzin scrubber - Plan layout. |
| 35 | 28 | Benzin scrubber - Flow diagram. |
| 36-37 | 28 | List of equipment. |
| 38 | 31-33 | Storage tanks for benzine and fuel gas to be sold. |
| 39 | 31&33 | List of equipment. |
| 40 | 32 | Pump house, storage tanks. |
| 41-42 | 32 | List of equipment. |
| 43 | 36 | Nitrogen tank. |
| 44 | 38 | Hydrogenation gas tank & list of equipment |
| 45 | 39 | List of equipment - Benzin waste station. |

| Item No. | Page | Bldg. | |
|---|---|---|---|
| 50B cont'd. | 46 | 45 | Gas Tank. |
| | 47 | 51 | Pump house - Claus plant - List of equipment. |
| | 48 | 54 | Crude water pump house. |
| | 49 | 54 | Plan layout. |
| | 50 | 54 | List of equipment. |
| | 51 | 55 | Water filter plant. Plan layout. |
| | 52 | 55 | Water filter plant. Flow diagram. |
| | 53 | 55 | List of equipment. |
| | 54 | 56 | Collecting and settling basins. Plan layout. |
| | 54-a | 56 | List of equipment. |
| | 55 | 56 | Piping diagram. |
| | 56 | 56 | High and low pressure steam lines. |
| | 57 | " | Phenol water lines. |
| | 58 | " | Pure condensate lines. |
| | 59 | " | Compressed air lines. |
| | 60 | " | Hydrogenation gas lines. |
| | 61 | " | Nitrogen lines. |
| | 62 | " | Liquor distribution. |

ADDRESS NAVY DEPARTMENT,
BUREAU OF SHIPS

Section 341

REFER TO FILE NO.

QC/NTME(341)

# NAVY DEPARTMENT

BUREAU OF SHIPS

WASHINGTON 25, D. C.


7 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. There follows an index to one box of these documents, and a microfilm of the original documents in the same sequence that they appear in the index. The box number is for convenience only. The contents of this film are not to be taken as a complete record of the information obtained on any subject nor have they been grouped by topic.

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