

INDEX - MICROFILM REEL 195  
(Original designation Navy 5856-2)

Doc.  
No.

Part No. 8.

30776-31025

GAS - PRODUCTION

- 1 A 6-page mimeographed note of instructions dated at Böhlen on January 5, 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, Koppers 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 "Mineralöl-Baugesell" of March 1937 - for the Brinker layout connected with the Winkler generator.

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- 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 Eraunkohle 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 Thiesen 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-36153 of BAMAG-MEGUIN May 1935 Tower cleaning plant for water gas, capacity 700,000 m<sup>3</sup> per day for BRABAG, Böhlen.
- 15 Blueprint of drawing 4M-A39714 of BAMAG-MEGUIN - 1943, Ash disposal outlet with separate gratebox, uncooled for BRABAG.
- 16 Colored blueprint of drawing He 63172f 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-1130 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 alkazid plant.
- 22 Blueprint of drawing MG215-1 Leuna 1944 - Sulphur burning installation for Building Me 951.
- 23 Blueprint of drawing M 10727-2, Leuna - 1942 - Project for an ethane cracking plant.

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- 24 Blueprint of drawing 6987/i 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 of 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.
- 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-Bohlen - 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.

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- 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 2 removal - at Heydebreck Me 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 Me 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.
- 49 Blueprint of drawing M5003-2 - Leuna 1938 - Piping layout for the cleaning of H<sub>2</sub>S - containing CO<sub>2</sub>-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 - flow diagram of the copper solution regenerator. 1944.
- 55 Blueprint of drawing 316-1 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 Blueprints of drawing H-999e of the Deutsche Ton und Steinzeug Werke A.G., Krauschwitz - 1943, showing acetylene cleaning plant (2 copies).
- 58 Blueprint of drawing without number, 1943 - 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 W3283-8 - 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 I.C. Farbenindustrie A.G., to the U. S. Military Government in Merseburg, of 24 April 1945, concerning the rehabilitation of the Leuna plant and the start of operation following discussion with the NAVTECHMISEU 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 M05052-2 - 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 0240: 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 isohexylene.
- 74 Blueprint of drawing M-2571-1 of February 1939 - Leuna - assembly drawing of the preparation of clay - unloading, drying and re-loading.
- 75 Blueprint of drawing 134-4 of Braunkohle Benzin 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).

AVIATION GASOLINE IV

- 1 An 18-page multicopied 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 drawing 001-1 of January 1941 by Friedrich Uhde at Leuna - proposed alkylation plant for a 25,000-tons-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).

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- 13 Letter-size sketch O/981 Leuna 1940 - Sketch of butane treatment, containing: Isomerization, dehydrogenation, polymerization and hydrogenation, as one method and: Isomerization, dehydrogenation and alkylation as second method.
- 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 Building Me 1000, 1000a, and 1000ax (2 copies).
- 21 Blueprint of drawing M-11488-2 Leuna April 1943 - Alkylation plant - butane separation Building Me1002 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 catalyst oven system - at Feitz.



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- 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 M81152-2 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 1000 ax (see also Document 19).
- 29 Blueprint of drawing M4917-1 - Leuna 1942 - same as Doc. 19 and 28 - revised.
- 30 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, Bahr process, capacity 48,900-tons-per-year input.
- 36 Blueprint of sketch BSK 17 Leuna 1942 - Balance sheet of alkylation with chlorine dehydrogenation, M-C-process, capacity 48,900-tons-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 stabilization.

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- 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  $C_4$ .
- 45 BSK 37 - The ET-100 plant with chlorine dehydrogenation, M-C process - data taken from Oppau - input 60,000 tons per year  $C_4$ .
- 46 BSK 43 - Chlorine dehydrogenation, Bähr process, with isomerization - input 60,000 tons per year  $C_4$ .
- 47 BSK 46 - with catalytic dehydrogenation for 60,000-tons-per-year input  $C_4$ .
- 48 BSK 51 - with catalytic dehydrogenation for 45,000-tons-per-year input  $C_4$ , as per Dr. Conrad.
- 49 BSK 55 - same as Doc. 48 for 60,000-tons-per-year input.

## PART II

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

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

OXYGEN PLANT.

- 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 Dec. 1944 - 10 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 M.P.A.G, Augsburg 1939, showing assembly of a 450 m/m compressor for the oxygen plant #1019 at Böhlen.
- 5 Blueprint of drawing A3839 (Old) of M.P.A.G, 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, Aerolith filter for the oil separator used with the Heylandt expansion machine.
- 9 Sketch of the ASW-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 hydrocarbon gases. Gives flow diagram, engineering and test runs, material balances, individual fraction balances, heat balance, energy requirements, efficiencies, and operating personnel needed.

1ST PART - PHENOL EXTRACTION

- 1 Photostat on cloth of the hydrogenation plant at Leuna as of December 15, 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 Brück and Pöhlitz.
- 3 A group of 3 blueprints of sketches on Phenol extractions:  
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 M3959-5 - 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 plant 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 Goschel 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.

(2nd Part - Miscellaneous)

- 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 turbine 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 30000 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 30000 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 Kemke 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

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- 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 Reinke, 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 - areobenzin).
- 18 Blueprint 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 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 Scn.2018-2 of Flechhammer dated 1942 - flow diagram for the production of gasoline with the IMD process, capacity of 210,000 tons per year of IMD 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."

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## PART NO. 12

CATALYST PREPARATION AND REGENERATION

- 1 Blueprint of drawing M4238-1 - Leuna, 1944 - Sketch of 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.

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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  $H_3PO_4$ .
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/1340 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 re-generator, drawing superseded by #3766-1.
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.



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- 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 C/142 -Leuna, 1934 - sketch of sprayers and washers in Building Me 22d, at Leuna.

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PART NO. 13

31530-31726

FLOW DIAGRAMS OF VARIOUS PROCESSES  
AND MISCELLANEOUS DATA

- 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 SXO plant. 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 207. 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.

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- 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-4733-1, Leuna, 1941 - Cyclohexanol plant in Building Me 978 - diagram for the monthly production of 1350 tons of cyclohexanol showing 30 pieces of equipment, flow diagrams, sizes, capacities, and detail drawing numbers, and location of measuring equipment.
- 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.
- 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 Me979. 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 Feb. 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 dioxide, rhomboid sulfur, and sulfur trioxide.
- 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.
- 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 obtaining paraffins, synol-alcohol fractionater 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.

<u>Doc. No.</u>	<u>Part No. 13 - Cont'd.</u>	<u>FRAME NOS.</u>
29	Blueprint of M5142-1, Leuna, 1942 - flow sheet of the isomerization plant Building Me 1005 - supersedes M-5018-1.	31530-31726
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, Scholven-Equilibrium curves between vapor and liquid for a vapor pressure relation $\frac{p_1}{p_s} = \alpha \text{ of } 1+4.5.$	

<u>Doc. No.</u>	<u>PART NO. 14</u> <u>MISCELLANEOUS FLOW SHEETS</u>	<u>31727-31788</u>
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 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. NH <sub>3</sub> 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.	

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- 9 Blueprint of drawing M4285-2, Leuna, 1939 - installation of the aldehyde storage plant, with filling device and safety features.
- 10 ~~Blueprint of drawing M5335-2, Leuna, 1938 - flow diagram of a proposed plant for 20 tons per month of hydroxyl-aminesulfate and oxime. Description of 14 pieces of equipment.~~
- 11 Blueprint of drawing M8308-2, 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.
- 16 Blueprint of drawing M8329-2, Leuna, 1941 - flow diagram of the experimental acetic acid plant Building 238.
- 17 Letter-size blueprint of M4395-16, Leuna, 1942 - flow sheet of an experimental installation for the preparation of lacquer in Building Me 417.
- 18 Photostat of sketch OX-182 - diagram of a trimethyl-olethane 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.

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- 21 Paper by Dr. Delfs, of IG-Leverkusen, dated 13 October 1941 on "The polymerization of tetrahydrofuran" - 22 pages.
- 22 Blueprint of drawing M1410-4, Leuna, 1935 - flow diagram of the propane and the oxygen for an ethylene oven.
- 23 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  $P_3$  in Building Me 981.
- 28 Bluepring of drawing M5296-8, of October 1938 - Leuna - sketch of the preparation of pure butadiene from butane and chlorine, showing chlorination oven - mono cracking - cold chlorination - Tri and Di-cracking - washing - then washing of the HCl and HCl electrolysis 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).
- 31 Blueprint of drawing M3419-1, Leuna, 1940 - flow sheet of the  $P_3$  plant in Building Me 981 (see Doc.#27).  
Charge: Propionic aldehyde, formaldehyde NaOH  
Result:  $P_3$  and sodium formiate.

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- 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 M4381-1, 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).