

Saltigo – Manufacturing facilities

Plant 1 **Phosgenation**

Plant 2 **High-pressure hydrogenation** **Chlorination** **Distillation**
Crystallisation

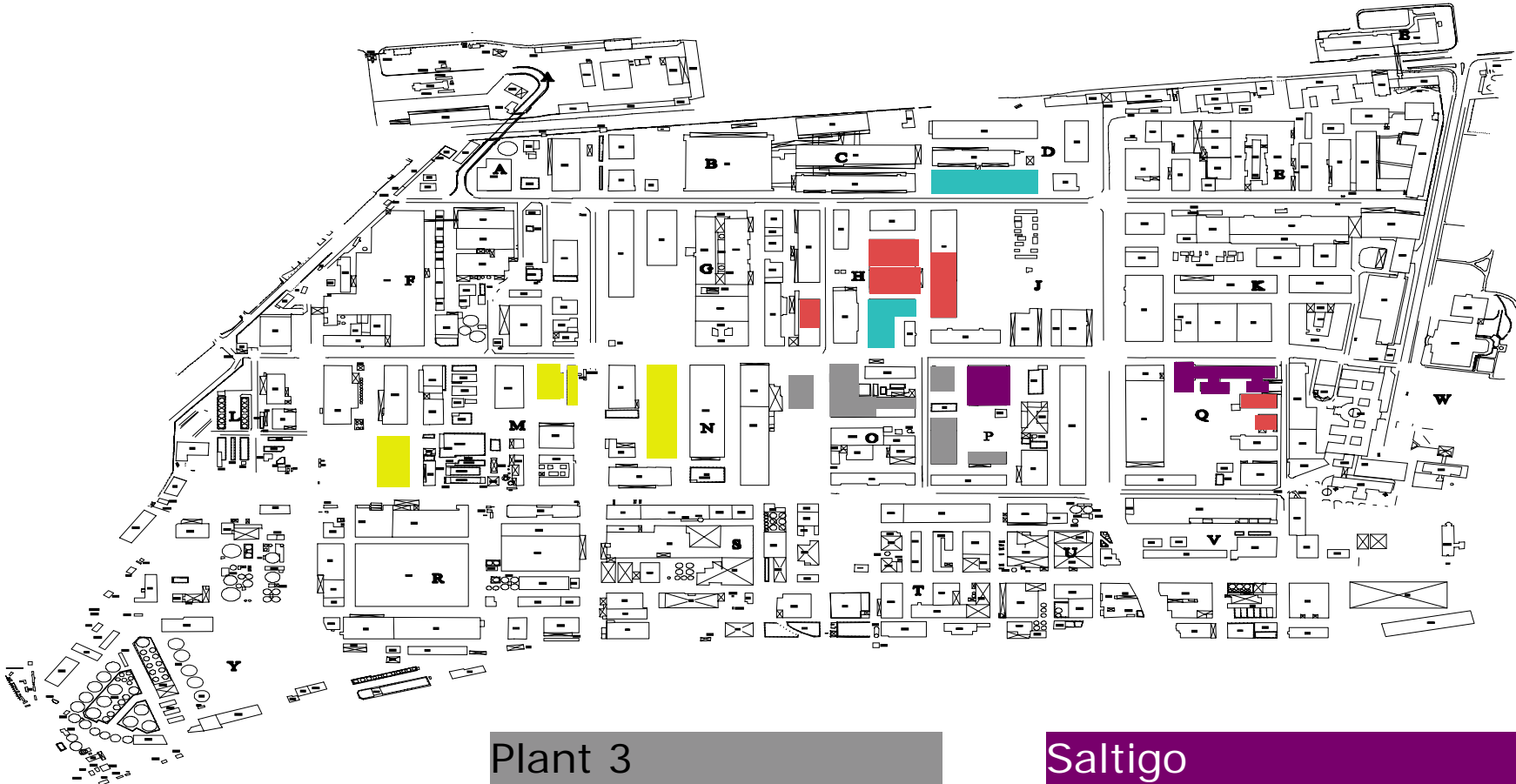
Plant 3 **Condensations** **Nitration** **Chlorination**
Friedel-Crafts reactions **Sulfonation** **Methylation**

Plant 4 **Solids drying** **Acidic hydrogenation**
Milling **Organometallics**

Plant 5 **Pilot plants:** **ZeTO I**
ZeTO II
Q17

Saltigo – Manufacturing facilities

Leverkusen Site



Plant 1 Dormagen

Plant 2

Plant 3

Plant 4

Plant 5

Saltigo
Headquarter &
Process Development &
Technology



Basic Technology: Phosgene chemistry

Typical reactions

- Continuous and batch phosgenation
- Gas- and liquid-phase phosgenation
- Formation of aliphatic and aromatic chloroformates, carbonates, isocyanates, carboxylic acid chlorides, ureas, urethanes
- Deep temp. reactor to $-40\text{ }^{\circ}\text{C}$
- Up- and down-stream chemistry to phosgene steps

Equipment

- 27 reactors;
total reactor volume 350 m^3 (40 % gl)
- 7 filtration/drying devices
- 9 distillation columns



Basic Technology: Hydrogenation, Chlorination, Distillation, Crystallization

Typical reactions

Hydrogenation

- Catalytic hydrogenation of nitro functions, ketones, etc. at 2-200 bar
- Enantioselective hydrogenation
- Reductive aminations
- High-temperature alkylations

Chlorination

- Aromatic chlorination
- Side chain chlorination
- Chlorinations with PCl_3 , PCl_5 , POCl_3

Processing Plant

- Distillation
- Fractional crystallization
- Granulation

Equipment

- 3 x 2 m³ ss reactor cascade
- 5 m³ hastelloy reactor
- 5 m³ ss reactor (350 °C)
- One train CGMP qualified
- 3 distillation columns

- 14 reactors, total reactor vol. 165 m³
- 70 % gl, 20 % Ni, 10 % ss
- 10 distillation columns

- 14 distillation units, ss (up to 120 theor. plates)
- Melt crystallization unit
- Pan granulator

Basic Technology: Chlorination, Ethylene oxide chemistry, Oxidation, Methylation, Chlorosulfonation, Nitration, Sulfonation, Friedel-Crafts

Typical reactions

- Chlorination using Cl_2 , SOCl_2 , POCl_3 , SO_2Cl_2
- Ethoxylation, methylation
- Diazotisation using methyl nitrite
- Discontinuous nitration of aromatic compounds
- Friedel-Crafts reactions
(including those in chlorinated solvents)
- Condensations

Equipment

- 125 reactors, total reactor volume 1,350 m³
- 65 % gl, 35 % ss/alloy
- 40 filtration/drying devices, hastelloy filter dryers
- 9 distillation columns



Basic Technology: Acidic Hydrogenation, Organometallic chemistry, Drying

Typical reactions

- Acidic hydrogenation
- Sodium boranate reduction
- Photochemicals
- Chlorination with SOCl_2 , POCl_3 , SO_2Cl_2
- Hydrogen peroxide oxidation

Equipment

- Total reactor volume 520 m³ (70 % gl)
- 4 gl autoclaves (6 - 10 m³, ≤ 16 bar)
- 4 ss autoclaves (2 -3 m³, ≤ 50 bar)
- 20 filtration/drying devices
- 8 dryers
- 2 distillation columns

Finishing for all plants

- Drying
- Milling
- Sieving
- Packaging
- (Re)-packaging
- 18 paddle dryers (ss)
- 6 tumble dryers
- Several packaging lines, blenders
- Milling/sieving lines

Technical Laboratories: Kilogram quantities at your demand

Plant 5

Technical laboratories fully equipped for the synthesis of starting materials, intermediates and final products according to DIN ISO specifications or APIs/CGMP

- **Chemistry**

Full range of organic reactions, including e.g. H_2 , HF/SF_4 , $COCl_2$, HCN , CO ; pressure up to 300 bar, temperature range $-40\text{ }^\circ\text{C}$ to $400\text{ }^\circ\text{C}$

- **Technologies**

Vessels up to 700 l (ss); glass up to 80 l, V4A, HC4, gl vessels and special materials
State of the art facilities, e.g. distillation columns (up to 6 m in size) and thin film evaporators

- **Staff**

Continuous day and night shifts
5 days/week



Over 40 years of experience in almost every area of organic chemistry, with more than 6,500 documented operating procedures

- 14,500 m² production and laboratory area in two main buildings
- Modular design, multi-purpose
- Around 120 to 150 products per year
- Approx. 60 % new products annually



Agitated reactors

- 130 units, 500 m³ total reactor volume (reactor vol. 100 l – 12.500 l)
- gl, alloy, ss, pressure up to 25 bar
- Autoclaves up to 200 bar
- Separate compartments for handling toxic / sensitizing chemicals

Compound isolation

- Distillation columns up to 68 theoretical plates
- Thin film evaporators
- Agitated nutsches - rotary dryers
- Granulators
- Filter dryers - contained packaging systems

General permission for “modern” and conventional chemistry, e.g.:

- Grignard reactions
- Lithium alkyls
- Reduction with complex hydrides
- Chlorination (Cl_2 , SOCl_2 , PCl_5 , POCl_3 , photochemical chlorination)
- Phosgenation
- Cyanide chemistry
- Hydrogenation up to 200 bar
- Cryogenic chemistry -100 °C up to 6 m³ scale
- Homogeneous catalysis: carbonylations, Heck reaction, Suzuki coupling, X-CN exchange, C-N coupling
- Chiral synthesis: diastereomeric resolution, asymmetric hydrogenation, enzyme catalysis, SMB