



Process Technology Center (PTC)

Thermal separation processes
and (bio)refinery

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The separation of mixtures of substances based on different boiling points has been known for a long time. Today, energy-saving membrane processes are commonly used for this purpose, especially in the petroleum and process industries for the recovery and recycling of solvents. With renewable raw materials, thermal separation processes are particularly important in biorefineries as a reliable purification method.

At the PTC, thermal separation processes occupy a large area: a technical rectification column, falling film and thin film evaporators, a filter scraper and tray dryer, and an innovative pervaporation/vapor permeation system spread over three floors. They are located in an Ex-zone (II/T3) and are equipped with a process control system and extensive inline measurement technology. All separation processes can also be connected to each other and/or to a 100-litre steel enamel reactor or a 100-litre bioreactor (fermenter). An external tank farm is used for the supply and disposal of these process chains, so that continuous operation over several days is possible.

For example, a bioethanol process can be completely mapped from fermentation to production of water-free, high-purity bioethanol, as can environmentally-friendly solvent recycling.

All the facilities correspond to comparable large-scale plants in terms of their structural equipment: product samples are representative and the scale-up of test results to production scale is valid. FHNW students receive high-level, application-oriented training at the PTC.

Infrastructure:

- 100-litre reactor, steel/enamel (-1/3 bar)
- 100-litre fermenter, steel/enamel (-1/3 bar)
- Rectification column (DN 100, -1/3 bar)
- Falling film evaporator (1 m²)
- Thin film evaporator (0.2 m² und 0.07 m²)
- Short path evaporator (0.04 m²)
- Pervaporation/Vapor permeation (10-20 l/h), polymer and ceramic membrane
- Filter slide dryer (100 l, Hastelloy)
- Product grinding, filling and packing
- Ex-Zone (II/T3)
- Tank farm (Ex-Zone) for solvent handling (continuous operation)
- Cooling rail +2 ... 8°C
- Heating steam 6 bar



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The FHNW incorporates nine faculties:

- FHNW School of Applied Psychology
- FHNW School of Architecture, Civil Engineering and Geomatics
- FHNW Academy of Art and Design
- **FHNW School of Life Sciences**
- FHNW Academy of Music
- FHNW School of Education
- FHNW School of Social Work
- FHNW School of Engineering
- FHNW School of Business

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