

The Fraunhofer Pilot Plant Center for Polymer Synthesis and Processing PAZ is a joint initiative of the Fraunhofer Institute for Applied Polymer Research IAP in Potsdam-Golm and for Microstructure of Materials and Systems IMWS in Halle. Under the guidance of Prof. Dr.-Ing. Michael Bartke (IAP) both institutes combine their competencies in polymer synthesis (IAP) and polymer processing (IMWS) in a unique way. This cooperation, the technical capabilities on a pilot scale and the high flexibility of the equipment are unique selling points on the R&D market.

POLYMER SYNTHESIS

In our polymer synthesis pilot plant, 350 machines as main equipment, 860 MSR facilities and 940 pipelines spread out over 600m² enable us to carry out highly automated pilot operations in polymerization technology.

Chemical (poly)reactions can be performed safely and highly efficiently thanks to our existing infrastructure which provides the necessary safety equipment (meeting the requirements of ATEX, PED and the Water Act), gas combustion, waste water pre-treatment and a connection to the chemical park's supply system of solvents, monomers, energy and process materials.

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Scale-up und Piloting

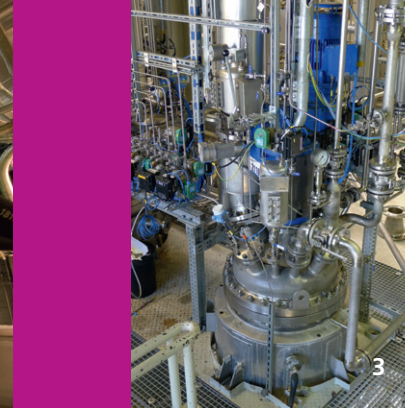
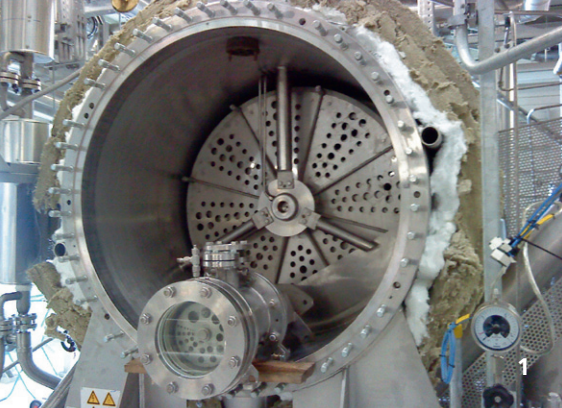
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POLYMER SYNTHESIS





1 10L laboratory disc ring reactor in comparable 1.25 m³ pilot plant equipment.

2 Single screw kneader 100L with 75 kW drive power.

3 670L reactor for solution polymerization.

COMPETENCIES POLYMER SYNTHESIS

We provide support for industrial research and development on both a pilot and laboratory scale in the following areas:

- development and optimization of new process steps and processes
- scale-up
- custom synthesis (generation of product samples) up to the ton scale
- recipe development
- measurement of kinetic and thermodynamic data
- physicochemical characterization of polymers

Our team is primarily made up of chemists, engineers, chemical technicians and laboratory assistants. The balanced mix of academic and practical backgrounds, creativity and experience allows us to develop new approaches, find creative solutions and implement these efficiently.

EQUIPMENT

A wide range of technologically important polymerization processes can be performed in the polymer synthesis plant, for example:

Line	Example of polymers
solution polymerization (anionic, coordinative)	synthetic rubber
emulsion polymerization (continuous, batch-wise)	PVAE, PVC
heterophase polymerization (precipitation, emulsion, suspension)	polystyrene, paint components, gels
polyamide	PA
high viscosity technology (single and double screw kneading reactors, disc ring reactor)	rubber processing, specialty polycondensates
gassing/hydrogenation reactor (BIAZZI)	mass polymerization, polystyrene derivatives, hydrogenated polydienes
continuous polyester line	PET/PBT

In addition to the pre-installed lines, completely new technologies are also possible thanks to the flexible combination of devices and equipment. The majority of our recent development work has been carried out using such custom layouts.

In addition to the technologies listed above, we also provide the laboratory facilities needed for feasibility studies and preliminary tests. We also provide the equipment and expertise for the process analysis.

TECHNICAL PARAMETERS OF THE EQUIPMENT

- reaktor volumes: 50 to 1000 L
- operating pressure: -1 to 100 bar
- operating temperature: 30 bis 350 °C
- throughput: 5 to 100 kg/h
- final viscosities: up to 40.000 Pa·s possible
- reactor material: mainly stainless steel type 1.4571 (316 Ti grade), enamel

Both batch-wise and continuous operation of the pilot plant is possible. Our current staff makes 24 hour operation on a short to medium term basis possible. This enables us to generate sample amounts up to the metric ton range.