

Polybutylene Terephthalate (PBT) technology

The most commonly used PBT technology found in about 70% of plants worldwide

Polybutylene terephthalate (PBT) offers superior strength and durability compared to other polyesters. It also offers outstanding chemical resistance and physical properties making it especially suitable for applications in engineering plastics, automotive and high-value textiles.

A premium provider

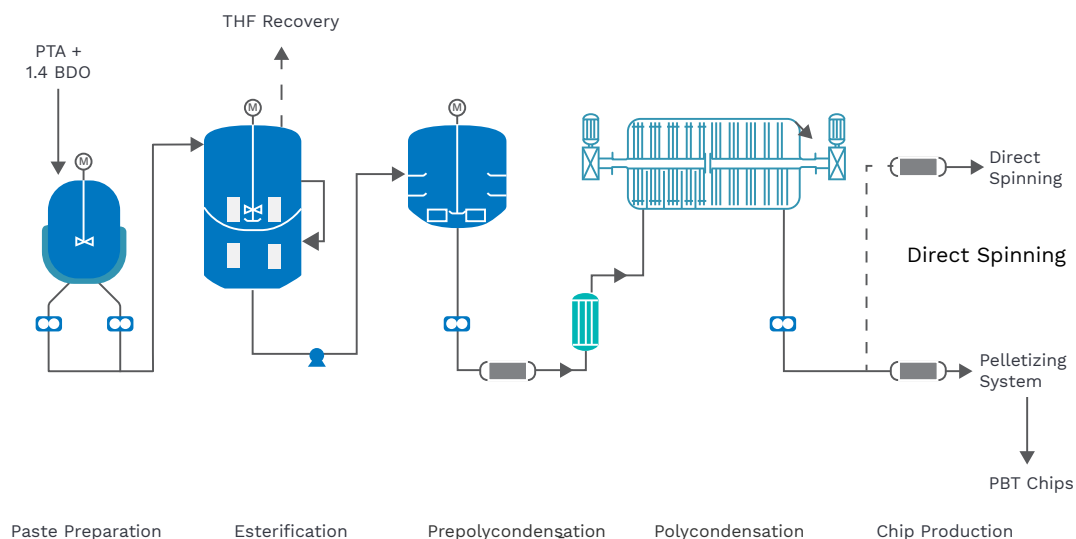
Zimmer's PBT technology accounts for approximately 70 percent of the plants built worldwide in the last decade. Our plants are highly reliable and cost effective, offering an exceptionally high yield of the required feedstock 1.4 butane diol (BDO) and purified terephthalic acid (PTA). In addition, it provides tetrahydrofuran (THF), a valuable side product in a very high purity. The PBT chips' quality complies with highest product requirements and can easily be processed.

Proven technology

Our track record of innovation in the engineering of PBT polycondensation plants stretches back more than 25 years. For example, we pioneered the use of PTA as a feedstock, driving down the costs of PBT production. We build plants from small-scale batch facilities for specialty products to continuous single-line plants with capacities of up to 400 tons of PBT.

The PBT production process and efficient reactor design

In our three-stage reactor process PBT is produced starting from 1.4 BDO and PTA. The raw materials are esterified. The final reaction step to reach the desired high viscosity is done in Zimmer's proprietary Double Drive Reactor (DDR). Our unique reactor design has enabled us to develop a more efficient process for high viscosity melt. The reactor allows for flexible, cost-efficient PBT production without the need for additional equipment.



Three-reactor PBT polycondensation process for medium and high intrinsic viscosity chip production or direct spinning.

Zimmer PBAT and PBS Technology

Zimmer has expanded its portfolio with biodegradable polymers polybutylene adipate terephthalate (PBAT) and polybutylene succinate (PBS) that are produced in similar processes. In the continuous operation PBAT process, the raw materials PTA, 1,4 BDO and adipic acid (ADA) react in an esterification process. Through consecutive steps, polycondensation takes place with formation of PBAT.

PBS is a biopolymer from polycondensation of succinic acid and 1,4 BDO and can therefore be produced from bio-based sources. Due to their physical properties and the biodegradability, both polymers are especially suitable for applications such as films or foils, e.g. in agriculture.

Zimmer offers a special plant setup that enables flexible production of all three polymers depending on the requirements of the market.

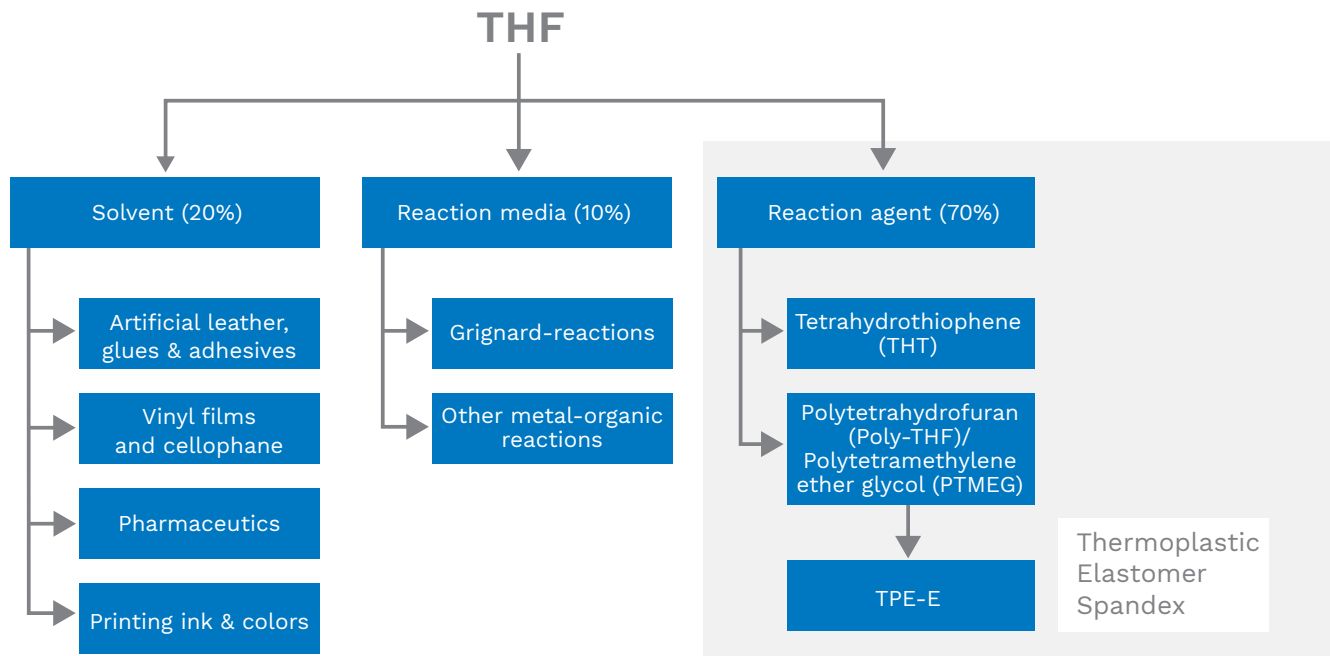
Tetrahydrofuran (THF) recovery for better return on investment

THF, a valuable byproduct of the PBT/PBAT/PBS chemistry, has a wide range of applications from solvents over reaction agents to monomers. Zimmer's distillation system reliably produces high quality, pharmaceutical-grade THF at high yield, ensuring attractive returns. The recovery of THF is offered as part of Zimmer's PBT/PBAT/PBS technology or as a stand-alone solution for other polymer plants.

Technip Energies Zimmer Polymer Technology

We provide technology, engineering, project management and procurement services for polyesters (PET, PBT, PTT, PBS, PBAT) and polyamide (PA6, PA6.6) production plants. We are focused on our customers' needs. Over the last 70 years, our engineers have worked to enhance our portfolio of well-proven technologies using in-house research and development facilities. This dedication to quality has helped us to build an outstanding track record of placing our technologies in more than 800 plants.

As part of a global network of centers which manages the company's expanding portfolio of onshore process technologies in petrochemicals, refining, hydrogen and syngas, polymers, gas monetization and renewables, we have access to Technip Energies' leading global engineering, procurement, project management and construction network. Technip Energies operates in 34 countries around the world with more than 15,000 employees.



Applications of THF