

# Whitepaper – Innovative Chemical PET Recycling

## ■ The Future of Sustainable Plastics with SMS Technologies

As the global focus on sustainability intensifies, the plastics industry faces growing pressure to adopt sustainable alternatives to traditional recycling and crude oil-based raw materials. Buss-SMS-Canzler is at the forefront of this shift with innovative chemical PET recycling solutions offering new perspectives.



Evaporation  
Technology



Drying  
Technology



High Viscosity  
Technology

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Unlike traditional recycling methods that simply melt and filter PET (polyethylene terephthalate), chemical recycling breaks down the polyester molecules into their original monomers. Advanced processes such as hydrolysis, methanolysis, glycolysis, and enzymolysis enable the recovery of these valuable monomers like terephthalic acid (TA) and ethylene glycol (EG), as well as pseudo-monomers like BHET or DMT.

They then serve as the base for new virgin PET (vPET), providing a closed-loop recycling solution.

## Challenges

The biggest challenge in chemical recycling lies in the purification processes surrounding the depolymerisation reactors, as the complex nature of the substance mixtures often exhibit

- ✓ high viscosity
- ✓ severe crust formation
- ✓ abrasion
- ✓ reactivity

Conventional static systems quickly reach their limits in these areas. This is where the innovative solutions from SMS come into play.

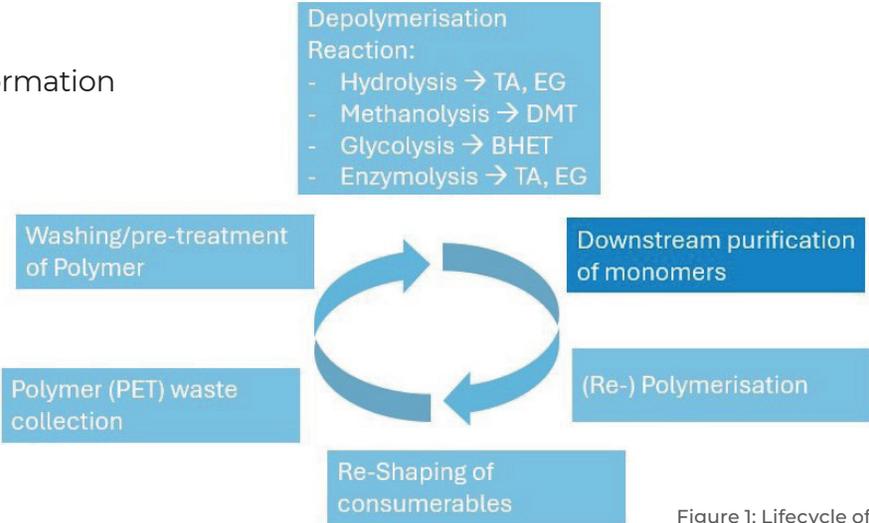


Figure 1: Lifecycle of PET in chemical recycling

## Solutions

### SMS Technologies: Pioneering Purification Solutions

Buss-SMS-Canzler’s specialised equipment, such as thin film evaporators, short path evaporators, and thin film dryers, is specifically engineered to handle the most demanding stages of PET recycling.

These apparatuses ensure smooth, reliable operations across key process steps. Within the past 10 years, SMS has identified and adapted its machines to accommodate

the following purification steps within chemical PET recycling:

- ✓ Drying of raw and purified terephthalic acid (CTA, PTA) after hydrolysis or enzymolysis (or BHET)
- ✓ Evaporation of ethylene glycol (EG) and diethylene glycol (DEG) from glycolysates and hydrolysates
- ✓ Evaporation of BHET (bishydroxyethyl terephthalate) from pre-concentrated glycolysates

## Tailored Solutions for Maximum Efficiency

Depending on the PET source and the customer's process, the properties of the monomers can vary significantly. For this reason, SMS provides its laboratories and pilot plants in Switzerland to adapt the machines to the specific monomer properties.

With tailor-made solutions, manufacturers can optimise the chemical recycling process, enhancing both efficiency and the purity of the final product. Buss-SMS-Canzler's adaptable systems guarantee maximum reliability, regardless of the process type, for companies committed to sustainable and future-oriented recycling.

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Tim Holtkamp / Specialist Chemical PET Recycling



Figure 2: D-Lab, laboratory thin film dryer used for drying CTA and PTA in our lab in Switzerland

### Exchange about your chemical recycling process



## Tim Holtkamp

tim.holtkamp@sms-vt.com  
+49 (0) 151 57 65 89 10



INFO

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