

Polystyrene Bottles

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The Chemical Company

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Polystyrene Bottles

Status quo dairy products

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Clear consumer trend towards reclosable packaging (convenience)

- Polystyrene has been used as a packaging material in the film/cup sector in the dairy and food industry for over 40 years.
- Cup markets for milkshakes/milk drinks have been largely replaced by bottles.
- New markets such as yogurt drinks and probiotic drinks are experiencing above-average growth and start with bottle products (wellness)
- Bottles have previously been made of PET (injection stretch blown) or HDPE (extrusion blow-molded).



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Feasibility study – the first steps

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- Replacing PET (not HDPE) with polystyrene makes sense in terms of raw material costs, density and processability.
 - PS preforms can be injection-molded in PET molds. Molding shrinkage is the same for PS and PET.
 - Stretch blow molding of PS preforms on PET equipment is possible; parameters such as temperature and blowing pressure clearly differ.
- Transfer to existing plants with existing molds is possible**



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Advantages of Polystyrene versus PET

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- No predrying is needed for injection molding of the preform.
- The processing window in injection molding is wider.
- PET requires 30 - 40 bar for blow-molding bottles; PS only needs 5-7 bar.
- The difference in density is > 20 % in favor of PS, i.e. the same bottle weighs e.g. – 25 g with PET, – 20 g with PS



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Advantages of Polystyrene versus PET

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- Raw material cost savings of > 20 % can be made at approximately the same raw material price.
- Reducing weight means > 20 % less waste = cost reduction (DSD fee etc).
- No pre-drying is required in injection molding and blow-molding is carried out at low pressure, less energy is used.



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Focus (applications)

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- The focus is on **dairy products** (e. g. whey-based products, milk-based products, kefir and buttermilk).
- Mechanical, organoleptic and microbiological tests on filled PS bottles (PS-I) were successful.
- PS is particularly suitable for dairy products due to its gas and water vapor permeability.
- Not recommended for packaging carbonated drinks.



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Products

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- A high impact grade (PS-I) has been developed for injection blow molding and injection stretch blow molding: **Polystyrene BX 3580**. All previous trials with dairy products were conducted using this product.
- There is also a standard polystyrene (transparent PS) – **Polystyrene BX 3585** – but it is important to note that this is not as tough compared to PET.
- A SiOx barrier layer can be applied to the inside of Polystyrene Bottles using a plasma process. A coated PS bottle gives e.g. an oxygen barrier like an uncoated PET bottle.



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Contact

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