



Group Technical - Packaging

Pasteurising PET

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Introduction and Background

- **As a brewer and beverage FMCG, PET is a packaging material we have adopted for some of our products and businesses**
- **....and it's a material we continue to have a desire to use for all of its obvious advantages.....light weighting, distribution & supply chain, recycling.**
- **But equally, we are very familiar with the technical compromises this material can present for our products and manufacturing processes**
- **But....when specifying its use its important to have clear understanding of your process as well as PET's chemical construction**



Introduction and Background

- Tunnel pasteurisation of products in glass and cans is the most widely used method of product stabilisation by food and beverage manufacturers
- When pasteurising product in glass/cans, temperatures can reach up to 70°C / 17minutes.
- Tunnel pasteurising PET has been difficult to achieve, and has involved premium designed & priced resins
- So.....we embarked on a process of bottle design with PET's deficiencies in mind; sympathetic to bottle shape and form



Introduction and Background – What's PET?

- **PolyEster Terephthalate**.....or more commonly referred to as, **PET**.
- It is a truly awesome polymer – cheap, flexible, generally compatible, glass like, light weight, recyclable.....
- Developed and patented in the early 1900's it was first used in the print industry
- 1973 – Revolutionises the soft drink bottles business
- Polyester makes up about 18% of world polymer production and is the third-most-produced polymer
- Diverse range of applications



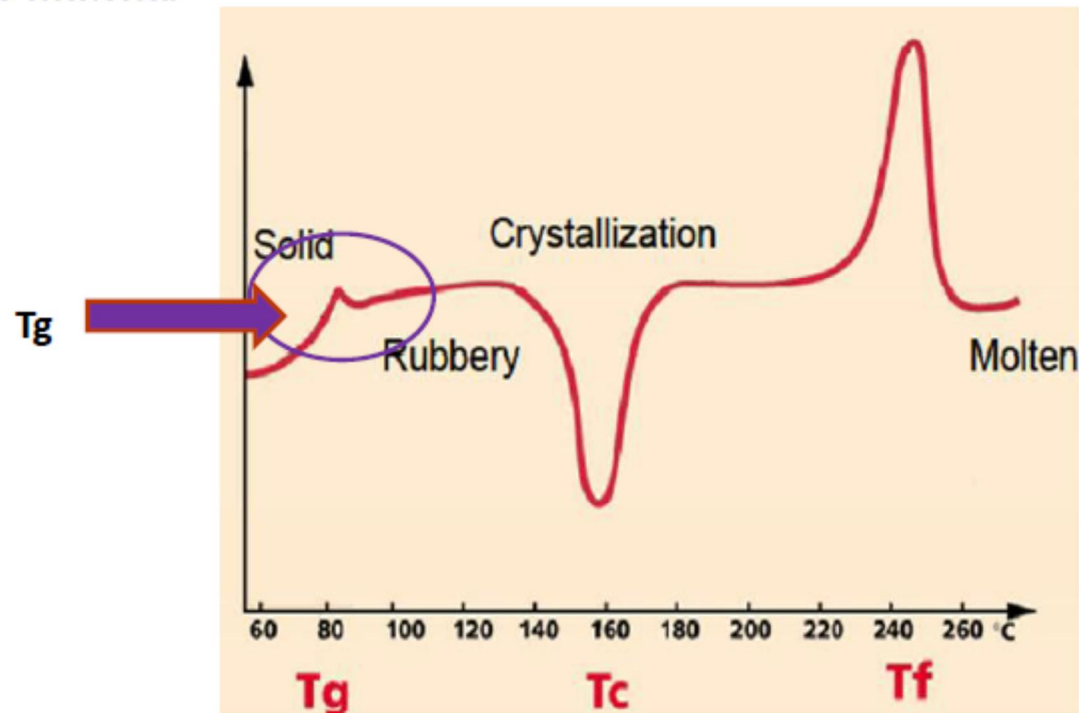
Introduction and Background





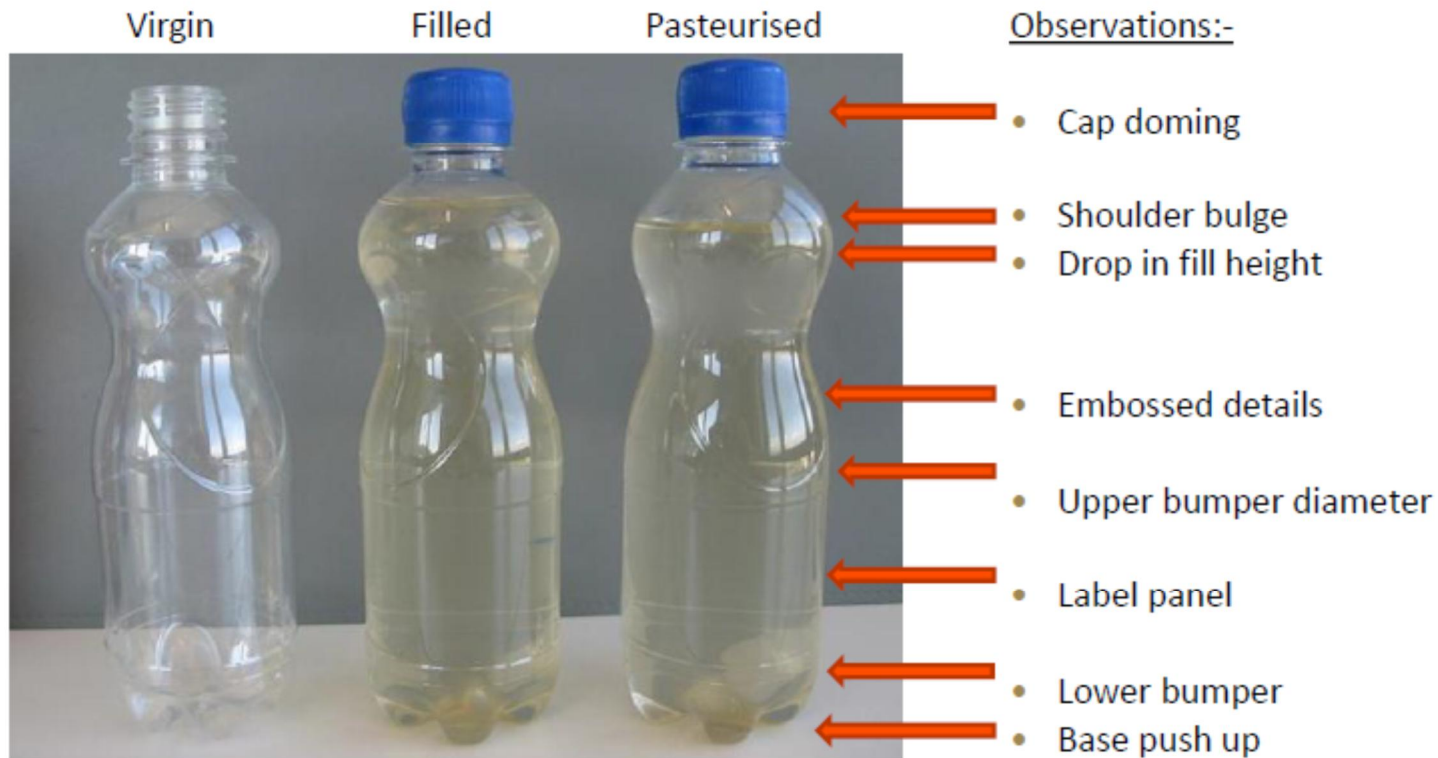
Introduction and Background – Why is PET a challenge for pasteurising

- Glass Transition Temperature – T_g 75°C. This is the softening point of the material





PET Trial Summary – Trial 1





PET Trial Summary – Trial 3, design mods and increase preform weight

Virgin



Pasteurised



Observations:-

- ← • Cap doming
- ← • Shoulder bulge
- ← • Fill height
- ← • Embossing
- ← • Upper bumper diameter
- ← • Label panel
- ← • Lower bumper
- ← • Base push up



In Summary - Key Benefits



- **SIMPLICITY. Packaging functionality and fit for use remains uncompromised.**
 - The real benefit is that for some beverage types, tunnel pasteurisation provides the ideal process to ensure quality and integrity of the packaged liquid, with the major advantage of mitigating the use of costly preservative systems.
 - The approach uses a combination of existing and accessible capabilities, immediately simplifying the filling and packing process, whilst ensuring packaged product quality. It promotes PET as a more robust beverage package than previously capable

- **SUSTAINABLE. Able to specify off the shelf, locally sourced, standard PET.**
 - versus a more expensive heat set option with limited availability, delivers a real sustainable and commercial advantage for a globally diverse manufacturing operation, and paves the way for additional brands and products to access the technology.

- **FREEDOM.**
 - Careful selection and specification of key bottle design and performance features, such as curves, radii, embossing and push ups, mean we are able to maintain and create alternate brand differentiating features for our packaging and marketing teams.
 - Existing labelling techniques and infrastructure. Marketing can consider product introductions previously not accessible.
 - Frees up the product formulators and brewers who are reassured about product integrity and no longer need preservative systems. Further opportunity to enhance flavour profile of a beverage.

- **GLOBAL. Truly transferable to the vast majority of filling locations.**



Pasteurising PET – Where Next?



- **New resin developments have potential to change the landscape once again.**
 - KPI's for PET are improving
 - IV & Tg increasing to offer further material capability,