

Myths & Facts about recycling of PET trays

16 June 2020





Everything you always wanted to know about recycling*

**but were afraid to ask*

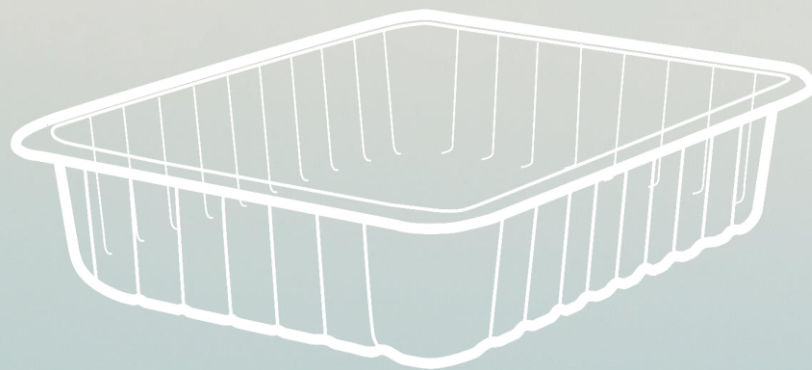
How many times can PET be recycled?

Why are there single-layer and multi-layer PET trays on the market for food packaging?

How are PET trays recycled?

Why is it not possible with a conventional PET bottle recycling process to recycle PET trays?

What are the pros and cons of PET versus other packaging materials?



How many times can
PET be recycled?

How many times can PET be recycled? (I)

TWO KEY POINTS:

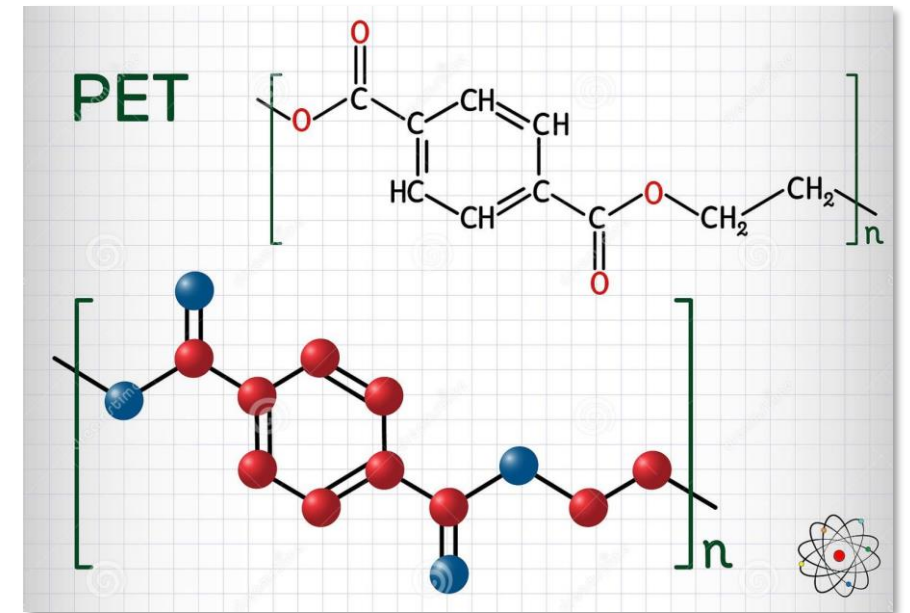
THERMAL HISTORY & PURITY OF RECYCLED MATERIALS

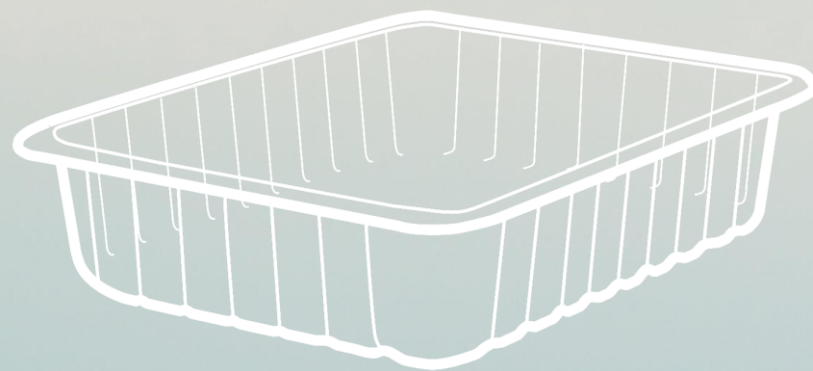
- **Thermal history** related to the average **molecular weight** of the polymer and the degree of **crystallinity** (or degradation)
- PET can be **repolymerized** in SSP or LSP units.
- **Chemical recycling** could regenerate PET, but **at what cost?**
Would it be competitive with synthesis from PX and MEG?
Purification?



How many times can PET be recycled? (II)

- **Inadecuated selection** can contaminate recycling (e.g. PVC) in such a way that it is unrecyclable.
- PET can be recycled and returned to the food production chain (**EFSA**: single polymer until now)
- It can be recycled in **ideal conditions** about **10 times**, in **real conditions 4-5 times**
- Important: **LSP or SSP**, improvement of recycled PET





Why are there
single-layer and multi-layer
PET trays?

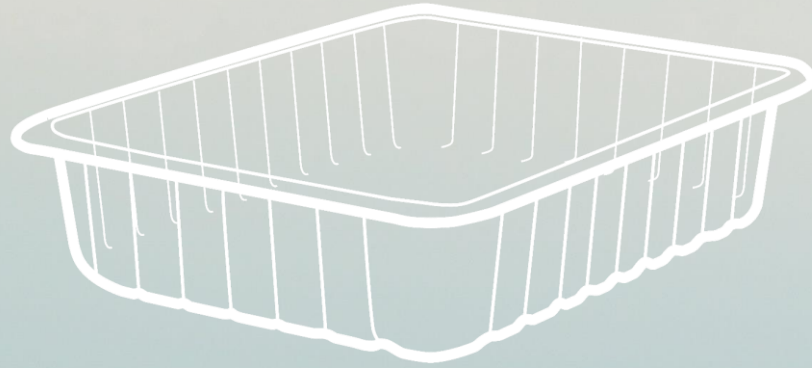
Why are there single-layer and multi-layer PET trays on the market for food packaging? (I)

- **Monolayer PET is an ideal packaging material**, as demonstrated by the beverage packaging industry.
- However, today the market is **60% multilayer vs. 40% monolayer**, and this is for the following **advantages**:
 - **Better base-lid sealing**, by being able to seal PE-PE. Higher packaging speed production
 - Easy to incorporate a PE/EVOH/PE **barrier layer** on both the lid and the base and increase the **food shelf life**.
 - **Lighter packaging** solutions can be achieved.

Why are there single-layer and multi-layer PET trays on the market for food packaging? (II)

- Both solutions are recyclable and **must coexist** in the market for it to be efficient.
- **Recyclers must provide a solution** for recycling the tray bale.
- The European **waste management schemes should generate a market** for tray bales.





How are PET trays recycled?

Why is it not possible with a conventional PET bottle recycling process to recycle PET trays?

How are PET trays recycled? (I)

- Industrial **processes for recycling PET bottles** have been known **since early 90s**.
- There are **some solutions that can be imported** to tray recycling.
- But since both fractions (bottle and tray) are different (*“different kind of animals”*), **other solutions must be developed**.
- It is very important to consider the **mechanical properties** of the material.



How are PET trays recycled? (I)

- Within the recycling of the **post-consumer tray**, target must be identified: p.e. transparent monolayer or transparent mono + multilayer.
- This decision determines:
 - The technology to be used.
 - The bale yield.
- SULAYR recycles **transparent monolayer & multilayer material**. A **delamination phase** is included for multilayer material.



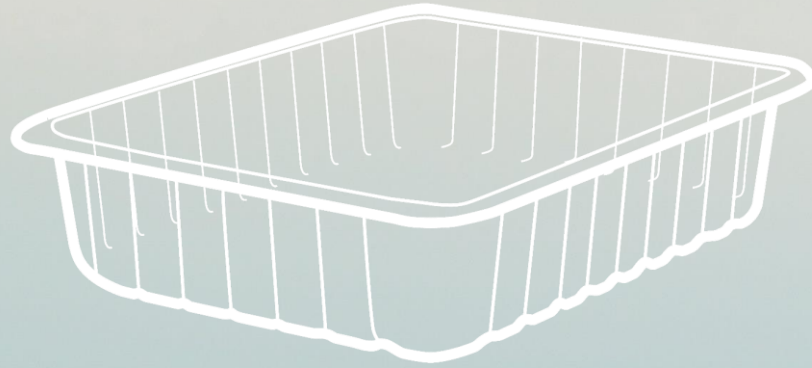
How are PET trays recycled? (III)

- Demand for PET flakes from post-consumer trays is growing. The bottle-to-bottle demand will take away 0.3-0.5 MMTn of rPET from the sheet market. A **Tray-to-Tray strategy is necessary** to meet the objectives of the Strategy on Plastics.
- Mandatory 25% “European” rPET on all beverage packaging by 2025.



Table 3. EoL scenario for 2030 based on the European strategy for plastics in a circular economy in 2030.

EoL Pathway	Multilayer [%]	Rigid PP [%]	Rigid PET [%]	Foamed [%]	PLA [%]
Share to incineration	35	35	35	35	100
Share to landfill	10	10	10	10	0
Share to recycling	55	55	55	55	0



What are the pros and cons of
PET versus other packaging
materials?

What are the pros & cons of PET versus other packaging materials? (I)

- Currently, PET is the only polymer that can be recycled in a **short circular economy model** (EFSA).



- It is a very safe material, with excellent mechanical properties for processing, and excellent optical properties. Good impact resistance and optimal barrier properties.

What are the pros & cons of PET versus other packaging materials? (II)

Material	Raw material Extraction	Energy required by container	Container weight / food weight	Food safety	Transport	Energy for recycling
PET	Medium	Low	Low	Very high	Very low	Low
PP	Medium	Low	Low	High	Very low	No data
Aluminium	Very High	High	Low	Vey high	Very low	High
Glass	Very High	Very high	Very high	Very high	Very high	Very high
Metal	High	High	Medium	High	Low	High
Paper	Medium	Low	Medium	Low	Low	Medium

- Polypropylene: not recyclable for the same circular economy loop.
- Aluminum: high energy consumption during manufacturing and purification.
- Glass: high energy consumption, high container weight, high transport costs.
- Paper: there are migration problems in direct food contact. It requires barrier elements that hamper recycling (e.g. TetraBrik).



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