



FACT SHEET by RECOUP PET/PE Trays

The fact sheet is produced to provide information on current topics within the plastics recycling industry. All information is based on current manufacturing and infrastructure within the UK and is produced with the support of RECOUP members and experts from the plastics industry.

Lamination

Historically meat trays were produced from Polystyrene, PVC, or PVC/PE. Manufacturers and brands started to move away from these materials as it became more apparent, they were harder to recycle and difficult to separate from PET. Trays produced to pack fresh meat are today mostly PET and are carefully designed to meet the needs of the product.

Lamination is used to produce materials containing more than one plastic layer or combining plastic with paper or foil. There are a number of different techniques for laminating depending on the type of material and the application the material is being used for. Multilayered packaging is different polymers stacked in layers in one sheet to enhance the performance of the packaging material. Each polymer contributes in its own way to the overall technical functionality of the packaging. A common combination in multilayered packaging is PET/PE.

Polyethylene terephthalate (PET) is often used for water and gas barrier and mechanical strength, while polyethylene (PE) is often used because of its excellent sealing properties, water barrier properties and low-temperature performance.

Lamination is ideal for all food products that need to be protected and have extended shelf life.

Main functions of laminates

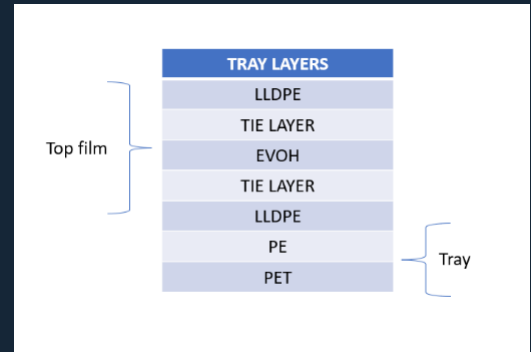
- Improves strength
- Tear resistant
- Protects from light, moisture and gas
- Protects freshness and aroma
- Provides excellent sealability
- Many of today's packaging films are multilayer structures ranging from 3 to 30 layers
- They are referred to as co-extruded films because they are made by a multilayer coextrusion process
- Additional layers known as tie-layers are added when using additional barriers, tie-layers act as an adhesive

PET/PE Trays

Typically, a meat tray formed from PET with a PE layer/adhesive to ensure the top film attaches and seals correctly would be the preferred option. This is for various reasons, firstly being it is easy to handle, the manufacturing process is quick, and it provides excellent sealing properties for the top film and as PET has a lower melt point to PE means the film can weld to the tray easily thus prolonging shelf-life of the product.

Meat trays are mostly made using the thermoforming process, either at a packaging manufacturer, supplying trays to the packer, or formed onsite using FFS (Form, Fill, Seal) machinery. The speed and ability to adapt tooling easily making this process ideal for producing large volumes of trays. Meat trays with a PE layer can contain an EVOH barrier, sandwiched between the layers of PE, to provide an oxygen barrier and to provide protection against bacteria.

The combination of different, inseparable polymers makes this format difficult to recycle; PET/PE trays are classed as not recyclable. PET (mono) material options are available, without the PE layer. Depending on the type of packaged protein, thermoformed trays would also include an absorbent pad to collect the meat juices. As recycling and testing of packaging has developed it was realised, the absorbent pad is not always removed by the consumer meaning it is left in the tray, which can contaminate further recycling. New innovations in tray manufacturing in recent years has seen meat trays feature a new design where the base of the tray captures and retains the liquid without the need for the absorbent pad. This means the new PET tray can simply be rinsed and recycled.



In this example, PET forms a top film for uses such as cooked meats.

Example of mono PET fresh meat tray that retains liquid, the tray is easy to rinse and recyclable.



Recyclability

One rule-of-thumb used across all guidelines is that use of single materials is the preferred choice for recycling. Where different polymers are used and are difficult to separate at either the sorting or re-processing stage, this will cause problems. In the case of PET/PE; if PE is processed with the PET, there is a risk that the lower melt point of PE will cause imperfections in the finished product.

Rigid PET packaging represents a significant fraction by weight of the domestic plastic waste stream. One particular difficulty is the widespread use of PET/PE multi-layers (e.g., in the processed meat sector). As already indicated, use of mono-materials or mixed materials of the same type are the materials of choice from a recycler's point of view. Hence the current efforts by some producers, encouraged by RECOUP, to switch from PET/PE blends to monolayer PET for trays should further facilitate recycling. However, it should be restated here that it is appreciated that use of multi layers in this way may have a greater environmental benefit, in extending shelf life, than consideration of recyclability.

As with other PET packaging formats, it is vitally important that contamination by PVC is avoided. PVC trays and blisters represent an important potential contaminant of the PET tray and blister stream, and every effort needs to be made to try and ensure that such contamination is avoided either through design and / or at the recycling stage.



Design guidelines to assist pack designers include guidance for PET trays.

Material Guidelines - PET Trays			
	COMPATIBLE for recycling	MAY BE SELETABLE for recycling for some applications	NOT SUITABLE for recycling
Colour	Clear / uncoloured	NR detectable colours*	Non-NIR detectable colours eg. containing carbon black
Barriers	None		PE seal Layer (Exide Ink (Nylon))
Coatings			

Can multilayer PET/PE be recycled? We asked RECOUP members from the recycling industry.

Consultant 1

We have a position – that design guidelines should state that multilayer cannot be clear – must always be coloured – to prevent it ever entering and therefore contaminating the clear stream.

The ONLY reason that clear PET trays are NOT made into clear PET trays is because of the (possible) presence of PE layers. PET trays are recycled into coloured PET trays.

Consultant 2

For the PET/PE trays, the PE layer is very hard to detect and eject. Only recent / rightly calibrated optical sorters would make the difference if and only if the trays are on its right side (as the PE is only on one side). Therefore, EPR should put pressure on this type of packaging to be replaced by mono-polymer.

Consultant 3

We put ALL the clear trays we recycle back into coloured recipes. We never put tray derived rPET into clear because we cannot separate the PET/PE, and so don't take the risk of it discolouring our clear stream. So, we put it back into our coloured APET stream, where the PE contamination is masked by colour. I don't know how this would fare with EFSA, but our team will have done the calculations and science behind it and deemed it safe.

Consultant 4

As claimed from the beginning, we do not support multilayer packaging solutions because of their detrimental cascade effects on the recycling streams and for this reason we disagree on the proposal of a Design for Recyclability for multilayer trays, and we have serious concerns about the potential consequences of such release.

Consultant 5

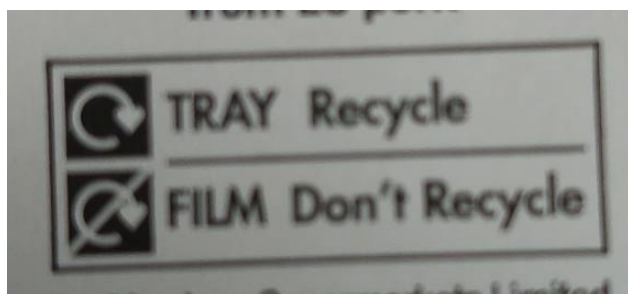
We have a lot of these trays go through our process and in general we do not have an issue; it goes into the good stream along with the bottles. As you know all of our resin goes back into bottle and tray, regular migration testing shows that it has no negative effect.

A good friction wash can remove a large amount of the PE layer. It also doesn't impact the select ability of the trays using NIR sorters, as long as you are able to get a reflection, you can teach the sorters to pick what you want it to, but in this case our sorters see them as PET, so we have no special classifier for them.

However, a couple of negatives, there is a possibility that it can be linked to haze in the final product, this hasn't been confirmed yet, but we are working on this analysis. Also, large amounts can impact the IV of the PET when extruded. But it is very rare for us to have a spike on this.

Current landscape

Pictured are the current rules for on-pack labelling on PE/PET trays. Although these trays are difficult to recycle, OPRL have allowed for 10% sealing layer on clear and opaque trays. However this will be phased out by 2025.



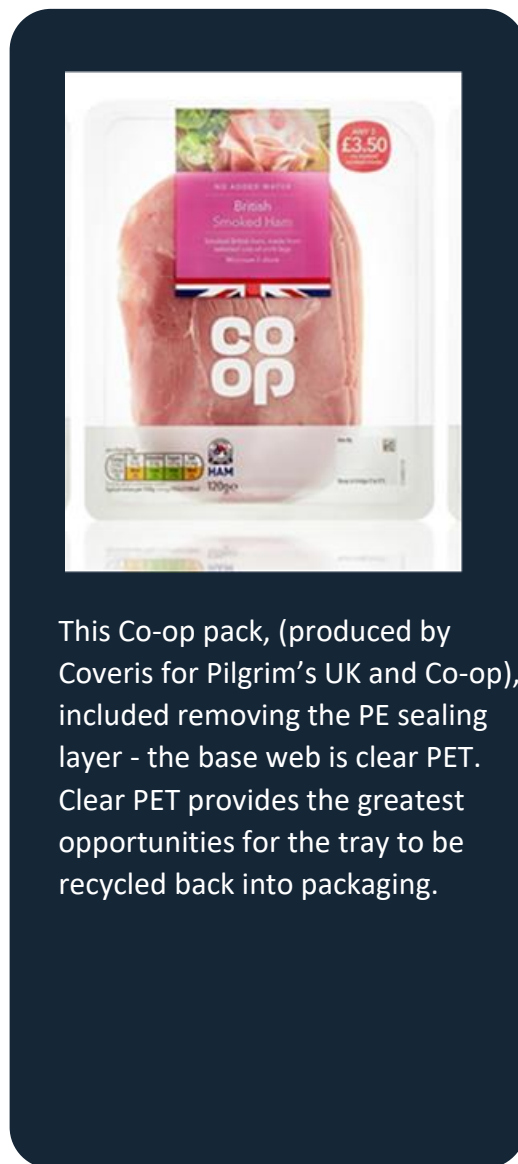
Summary

Guidelines need to reflect the rule that packaging should be assessed using 'most commonly used' sorting and recycling available in Europe.

Recyclability guidelines are a guide to other industries as to what is the best option for recyclers; and need to be simple enough for other industries to follow.

Recyclability guidelines are a reflection of how materials behave in the recycling chain now; not at some future date or using technology which is not yet available.

We can only produce guidelines when the protocol used to produce them is supported by the recycling industry, and confirmed by those who are actively producing and using recycled material. Where this opportunity does not exist; guidelines will not be viable or recognised.



This Co-op pack, (produced by Coveris for Pilgrim's UK and Co-op), included removing the PE sealing layer - the base web is clear PET. Clear PET provides the greatest opportunities for the tray to be recycled back into packaging.

Reference documents can be downloaded here:

<https://www.recoup.org/p/430/recoup-reports-packaging-recyclability-design->

REcycling of Used Plastics Limited (RECOUP)

Registered Charity No: 1072029 & Company Registration No: 02435729

1 Metro Centre, Welbeck Way, Woodston, Peterborough, UK, PE2 7UH

t: +44 (0)1733 390021 e: enquiry@recoup.org w: www.recoup.org

RECOUP