

RECOUP

RECYCLING OF COLOURED PET



by RECOUP

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REcycling of Used Plastics Limited (RECOUP) is a charity and leading authority providing expertise and guidance across the plastics recycling value chain. Built on a network of valued members, collaboration is central to its activities. RECOUP is committed to securing sustainable, circular, and practical solutions for plastic resources both in the UK and world-wide

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RECYCLING OF COLOURED PET

RECOUP have been gathering and collating information about the recycling and reprocessing of coloured PET. With the help and support of our members and stakeholders, we have been able to compile the following information to highlight the current situation with coloured PET in the UK, the views and opinions of others and current viable end markets.

Polyethylene Terephthalate (PET) is one of the most recycled plastics used in household packaging. PET is viewed by many as the most recyclable polymer, mainly due to the use of PET for drink bottles.

The recycled PET (rPET) used for packaging (sheet) is largely from recycled clear bottles. To help the recyclers of bottles, alternative sources of rPET would be welcome, which would keep the clear rPET material in a closed loop; to be used to produce bottles.

To this end, and, to help meet recycling targets; recovery and recycling of both coloured PET and non-bottle PET should be encouraged.

In brief: -

- Most coloured PET is from PET Pots, Tubs and Trays (PTTs).
- When PET from PTTs enters a bottle wash line, if using the wash procedure for bottles, this may be too harsh and result in flake turning to powder.
- When mixed with bottle flake, PTT material will have a detrimental effect on the IV level.
- The estimate is that PET trays not collected for recycling go to incineration (75%) and landfill (25%).
- In EU countries, there is a marked decrease in coloured PET, especially driven by the decision of Coca-Cola to remove green colour from Sprite.

Conclusion from End Markets Project



Collection of household Pots, Tubs and Trays (PTTs) has seen a significant increase since collection tonnages were first reported in 2007. As collection of PTT increases, the quantity of non-bottle PET collected for recycling will increase.

To effectively recycle this material, the UK needs to develop end market opportunities for PET.

Recognising this as an opportunity to help towards the UK recycling targets, WRAP instigated and funded a project to confirm that PET from PTTs is technically recyclable and has a range of end markets.

The project 'End Markets for PET Pots, Tubs and Trays'¹ concluded that financial investment is required to produce separate streams in the UK and Europe for PET from Pots, Tubs and Trays.

RECOUP declare on it's Recyclability By Design guidelines that clear PET is preferred to coloured PET (or any other polymer).

To improve recycling rates for PET from PTT's, UK local authorities need to be encouraged to collect this material. For this to happen, PTTs needs to be seen as a recyclable fraction.

It is generally accepted that material from PET trays is more brittle than PET from bottles. Compared to PET bottles reprocessing, significant yield losses are expected. The washing process used for bottle PET may be too harsh for PTT material, and lead to flake becoming too fine.

Trials undertaken have proven that recycling of PET trays is technically possible, typically through blending with rPET bottle/ virgin plastic in the manufacture of a range of products. However, clear PET is still a preferred material for re-processors, both bottle and tray material.

¹ https://wrap.org.uk/sites/files/wrap/Developing_End_Markets_For_PET_Pots_Tubs_And_Trays.pdf

UK Recycling Market Overview - PET

The most significant UK market for coloured PET has been as black sheet for thermoforming into trays. However, the recent negative publicity surrounding the recyclability of these products has led to several retailers specifying no black trays. Consequently, these products have shifted to clear or non-black coloured packaging which has significantly reduced the outlets for coloured PET flakes.

Green (or predominantly green) bottles can be separated and reprocessed for supply into the strapping market. The strapping is high tensile and used in demanding applications such as bale ties, securing construction products and securing consumer goods. There are currently no UK manufacturers of strapping, so any flakes or pellets made in the UK are all exported to mainland Europe, Turkey or further afield for final use.

One UK reprocessor used to reprocess green (approximately 5kt / annum) but due to commercial sensitivity it is not clear if this is still ongoing today.

Other smaller markets exist for coloured products such as injection moulding compounds, but these are very small; a few thousand tonnes per year, typically from post-industrial supplies into niche automotive applications, supplied by specialist compounding companies.²

² Taken from RECOUP report for RECOUP member, November 2018

Questions and Summary of Replies from Reprocessors and Recyclers

Q - Are you asking for coloured PET as input material?

The majority interviewed do take in coloured PET, although not as a major stream. The main input is still clear or clear/light blue PET bottles, as major end markets are bottle to bottle or sheet (thermoforms) and these customers still demand clear or clear/light blue flake or pellet.

Plastipak (Cleantech) explained that although they do not specifically buy in coloured PET to reprocess - as the principle business focus is reprocessing PET for new bottles - Cleantech receive a significant proportion of coloured in the bales.

Q - What are the end markets for coloured PET?

Markets include fibre, strapping, horticultural bedding trays, and thermoform / packaging sheet market.

Cleantech reprocess that stream into jazz flake (we do not onward sell the sorted post-consumer material) and have a strong demand for it. Indeed, we do not produce enough to satisfy demand.

A reprocessor also explained that coloured PET bottles are used in production of black fibre; although they – as is generally accepted – would prefer clear bottles. Levels of opaque might be acceptable but would need to be evaluated in terms of content and composition.

Q - Do you recover coloured PET as a separate fraction or mixed with other plastics?

The majority answered that coloured PET is mixed with 'mixed plastic'. The destination of this material is varied; with some sending for SRF or RDF.

Q - Do you recover coloured PET trays with PET bottles? If not, where are the coloured PET trays sorted to (e.g. residue)

Coloured PET trays not processed with PET bottles are removed in the system or removed manually and placed in with mixed PTT's / mixed plastics. Reprocessors explain that the amount of PET trays is marginal. This fraction may be sold on to a Plastics Recycling Facility (PRF) for further sorting.

One customer commented that they would be concerned if black PET started appearing in the coloured stream that they send for strapping, due to concerns around the green they use for strapping not masking the darker colour.

OPRL Guidelines

When OPRL released new guidelines; (January 2020); there were 3 changes to 'polymer choices' information; including.

- Coloured aPET/rPET comes into Recyclable for wider use

RECOUP and other guidelines continue to promote clear, not coloured, for bottles and Pots, Tubs and Trays, where possible. However, a market for coloured aPET/rPET needs to be found, and recycling encouraged. To this end, OPRL revised their rules to encourage the Coloured PET market.

Market Value for Coloured PET

Taken from WRAP 'Impact of increased levels of black and cream PET' ³

"Coloured PET is less valuable than clear PET, and so is not targeted in the same way by UK MRFs. In 2018, coloured PET bales from MRFs had an average value of £30/tonne, whereas clear PET had a value of around £100/tonne⁴. Prices have increased significantly in 2019 due to high demand for rPET, with both coloured and clear PET becoming more valuable. In July 2019, coloured rPET had a value of £60 – £100/tonne, the highest since 2011 according to Let's Recycle. Packaging Recovery Notes (PRNs) are also currently at a high, which may be causing the sorted bale price to be higher than usual, as the recyclers can claim the PRNs on the finished product.

The demand for both clear and coloured rPET appears to be increasing, however infrastructure may limit the recovery of non-bottle coloured PET. To determine this several waste management companies and two PET recyclers were interviewed.

The feedback from the end users suggest the industry is still relying heavily on clear rPET, although with the growing demand for bottle to bottle recycling, and several pledges from large brands and retailers, converters will be forced to look elsewhere for recycled PET to incorporate into non-bottle packaging.

For this reason, the coloured rPET stream may become more desirable, which could account for the increase in value of coloured rPET bales.⁵

Typically, any opaque material is removed because of high pigment levels which causes the fibre to break."

³

https://www.wrap.org.uk/sites/files/wrap/Increasing_recycling_of_NIR_detectable_black_and_cream_PET.pdf

⁴ Letsrecycle.com

⁵ This will also be affected by PRN prices

Placed on the market split by colour

		ktpa	%
PET clear	Bottles	317	72.0%
	PTTs	122	23.0%
	Total	439	100.0%
Coloured PET	Bottles	30	48.0%
	PTTs	7	11.0%
	Black	26	41.0%
	Total	63	100.0%

Summary

A recent WRAP report⁶ concluded that detectable coloured PET trays can be incorporated into the existing coloured rPET from bottles without any significant decrease in quality. Coloured PET has a limited market. Specifically, strapping, which is usually green. So, producers, who have to meet colouration specifications from their customers, prefer coloured PET to be able to 'make' green / be compatible with green. This can reduce colour options. Orange, purple, red or brown impact the outlet colouration and some recyclers remove these bottles when they produce for strapping.

As mentioned above; the issue with presenting coloured PET as OK is that we should be encouraging clear, not coloured, as clear has more markets and opportunities to be recycled.

Eco-modulation

A coloured PET bottle would not go back into a packaging application and would be of much lower recycling value - so eco-modulation would penalise coloured PET vs clear in most systems.

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https://www.wrap.org.uk/sites/files/wrap/Increasing_recycling_of_NIR_detectable_black_and_cream_PET.pdf

APPENDICES

Appendix 1; Further information from RECOUP Household Plastic Collection Survey

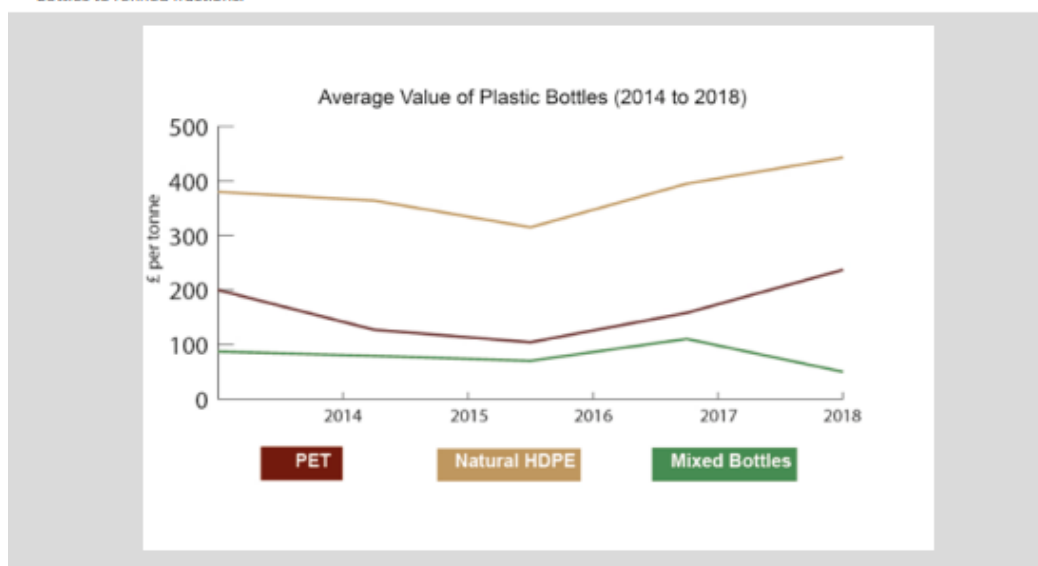
Value of Plastic Bottles Collected for Recycling

Plastic Bottles

Plastic bottles mainly consist of PET drinks bottles and HDPE milk bottles, but there is an increasing amount of other bottle types such as DIY, bathroom and cosmetic products, which can be made from PP, coloured HDPE and PET, and also PVC.

The highest values for collected plastics are when plastic bottles are sorted into their main fractions – mainly clear and light blue PET and natural HDPE. Coloured PET and mixed bottles are barely attracting positive values.

Using estimates and assumptions, the following analysis provides a clear demonstration of the additional value of sorting plastic bottles to refined fractions.



Mixed Plastic Bottles

Using the *REB Market Intelligence* material price index (www.rebnews.com), in 2018 1 tonne of mixed plastic bottles typically attracted an average price of **£40 per tonne** – this was **£110 per tonne** in 2017. This uses a combination of 'A Grade Mixed Plastic Bottles' (includes more clear PET and natural HDPE) at an average of £80 per tonne and 'Grade B Mixed Plastic Bottles' (includes more Jazz PET and HDPE) at £20 per tonne.

MIXED PLASTIC BOTTLES

- 370,890 tonnes of plastic bottles collected for recycling represented a potential value in 2018 of around **£18 million** – this was **£38 million** in 2017
- Real prices in 2018 ranged from **£0-£150 per tonne** – these were **£15-£215** in 2017

Sorted Plastic Bottles

To give a comparison of mixed plastic bottles to a tonne of clear and light blue PET and natural HDPE bottles, according to *REB New Intelligence*, average prices ranged from:

CLEAR & LIGHT BLUE PET

- Clear and light blue PET – **£160-£300 per tonne** with an average of **£237** (this was **£158** in 2017)

NATURAL HDPE

- Natural HDPE - **£360-£575 per tonne** with an average of **£443** - this was **£395** in 2017

Sprite bottles switch from green to clear plastic

Coca-Cola European Partners

In September 2019 drinks manufacturer, Coca-Cola launched the 'Clear is the new green' campaign.

This saw the iconic sprite bottle which had been green for 58 years turned clear to make it easier to recycle back in new bottles.

All of CCEP's bottles will move from 25% rPET currently to 50% rPET by June 2020, with the exception of glaceau smartwater, which moved to 100% rPET at the end of 2019. This is part of CCEP's ongoing effort to reduce the amount of virgin PET it uses.

The green bottles were previously recyclable, however, the clear bottles will be easier to recycle through mechanical methods. The green bottles currently go into the coloured PET fraction, with limited end markets and lower value compared to that of clear PET.

The use of rPET converts post-consumer waste into a valuable resource, reduces the use of virgin polymers in new packaging and has lower carbon footprint than virgin PET.



Evolve out of Black CPET Faerch UK

Faerch UK is introducing a solution to the UK challenge of black tray recycling as part of their journey toward creating a circular business with the launch of its new product *Evolve by Faerch*.

Evolve by Faerch is made from an average of 80% recycled PET post-consumer content, uniquely utilising mixed coloured PET as attractive food packaging. As the products are created from a natural mix of recycled PET, their colour will vary; the different palettes of colours enable consumers to recognise they use a recycled and circular product. The *Evolve by Faerch* trays are reliably detected by existing sorting infrastructure in the UK and returned to the mixed jazz stream where they can be recycled into new food safe products again and again.

Retailer interest in *Evolve by Faerch* is strong as public demand for sustainable and circular products increases rapidly. *Evolve by Faerch* complies with the strictest food regulations keeping food safe in the entire temperature range between -40C and + 220C and outperforming alternative packaging materials in particular on food safety, recycled content, and recyclability.

Spencer Johnston, Regional CEO Faerch UK & Ireland, said, "Evolve offers the consumers a ready meal tray that is made from recycled post-consumer material and that can be recycled again and again. This represents a significant step forward in packaging and enables consumers to make the switch to a sustainable solution."

Retailers who switch to the new product line can join an innovative recycling programme offered by Faerch: An identical quantity of the volume of Faerch trays a retailer sells through their stores will be sourced as post-consumer waste locally in the UK and recycled into new food grade trays at one of Faerch's production sites.

Faerch are committed to an active role in the plastic debate by driving the industry towards making food packaging truly circular. *Evolve by Faerch* is part of the journey by being fully recyclable and offering market-leading quantities of recycled content. Faerch is powered by 100% sustainable renewable green energy and is the only food tray manufacturer which has invested in ownership of a recycling operation.



Faerch



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