

PET PACKAGING

Introduction

This Quickstart is intended to be used in conjunction with APCO's Sustainable Packaging Guidelines (SPGs) by providing a quick high-level guide to design strategies that improve the recyclability of rigid polyethylene terephthalate (PET) packaging (bottles and containers).

The key barriers to PET recycling are the use of different polymers or materials with PET which cannot be easily separated, as well as the use of particular colour additives or adhesives which may cause contamination during recycling.

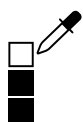
NOTE: The Quickstart is intended to be general guidance only, and the information provided has been developed based on current knowledge at the time of publication. Some of the information may not be relevant to all packaging types; for specific guidance on individual packaging items and to classify recyclability through kerbside recycling in Australia/ New Zealand, please refer to the Packaging Recyclability Evaluation Portal (PREP) and other resources. For eligible containers, refer to local state and territory jurisdiction to determine recyclability through container deposit schemes.

Tips for 'best practice' design for recycling



USE MONO-MATERIALS AND LIGHTWEIGHT WHERE POSSIBLE

Use only one polymer for all components, including caps and labels, or use polymers that can be easily separated in the PET recycling process (see table below). Avoid Polyvinyl Chloride (PVC) components as PVC has a similar density to PET, making it difficult to separate in the recycling process (float-sink method) and causes other issues in the recycled resin such as differing colours.



MINIMISE COLOURS OR SELECT PREFERRED COLOURS

Use clear unpigmented PET as this can be recycled back into new packaging and therefore has the highest value for recycling.



ENSURE COMPATIBILITY OF CLOSURES FOR RECYCLING

Use compatible materials (see table below) and aim for unpigmented or light coloured resins.



ENSURE COMPATIBILITY OF LABELS FOR RECYCLING

Use labels that cover minimal surface area to help facilitate accurate optical sorting at MRFs.



INCORPORATE RECYCLED CONTENT

Use the maximum percentage of recycled content to help create and support sustainable end markets for recycled PET.









INCLUDE LABELLING FOR RECYCLABILITY

Use the Australasian Recycling Label (ARL) to educate consumers on how to correctly recycle each component of the packaging.

Guide to selecting materials

NOTE: See international documents within resources below for more detailed guidance.

COMPONENT	PREFERRED	RECYCLABLE WITH REDUCED VALUE	AVOID (NOT COMPATIBLE WITH PET, CONTAMINANT)
Bottle/container material 	Monolayer PET	Non-PET barriers or coatings – it is difficult and costly to separate mixed materials, and these have more limited end markets	Ethylene vinyl alcohol (EVOH) barrier – causes significant issues in recycling Degradability additives – reduce durability of the recycled resin Nylon based barriers should be avoided
Bottle/container colour 	Clear unpigmented resin – easiest to recycle, widest range of high value end markets Transparent light blue – often added to clear material for recycling to offset some yellowing	Other light transparent colours, e.g. light green – technically recyclable but end markets are more limited	Opaque – e.g. White (titanium dioxide), black pigments (carbon black) or opaque colours – can be difficult to detect with optical sorters at the Material Recovery Facility (MRF), limited end markets, can contaminate and render a whole load of recycled PET not useable for end markets
Cap/lid – material 	PET, HDPE or PP Colour - Clear unpigmented resin Liner-less closure	HDPE, PE or PP Colour - light and transparent colours, e.g. light blue or green Low density silicone is preferred as it can be easier to separate	Dark coloured caps or lids should be avoided PVC – cannot be separated in the recycling process and reduces quality of recycled PET (renders the package non-recyclable) Metal or metal foils – difficult to separate in PET recycling, can block extruders remanufacturing or damage equipment Avoid wadding and silicone
Label - material 	OPP or PET (less than 1g/cm ²) as this enables the PET to be separated in the caustic bath (floats) Label covering < 40% of container surface area to facilitate optical sorting at the MRF	Paper – can mostly be removed in the recycling process but any residual fibre contaminates the recycled resin Label covering > 40% of container surface area – containers may not be sorted effectively at the MRF. Avoid dark coloured labels as this can reduce optical sorting (carbon black)	Polystyrene (PS) – difficult to separate in the recycling process Full sleeves (almost 100% coverage) – less-likely to be optically sorted at the MRF. If required, ensure double perforation and clear direction for consumer to remove at disposal PVC – cannot be separated in the recycling process and reduces quality of recycled PET (renders the package non-recyclable)
Label - inks 	Non-washable, non-toxic (aqueous, plant- based etc.) Direct printing is preferable only if plant-based inks are used	Highly coloured with a high level of bleed; ink bonding agents and over-lacquers - reduced quality of recycled resin.	Metallic inks – reduced quality of recycled resin
Label - adhesives 	Soluble at 60-80°C in alkaline conditions; washable and residue-free; non-toxic (aqueous, plant-based etc.) Minimal glue coverage is preferred as glues can reduce the quality of the PET when processing	Non-water soluble/dispersible adhesives – these are not sufficiently removed in the recycling process, contaminate recycled resin, can clog up recycling equipment. Avoid large glue coverage on pressure sensitive adhesive labels.	

RESOURCES

To assess recyclability of packaging through kerbside in Australia and New Zealand, use PREP:

- PREP Design Pty Ltd (2019), available at: <https://prep.org.au/>

For guidelines on international recyclability of PET:

- The European PET Bottle Platform (European), *Design Guidelines*
- The Association of Plastic Recyclers (USA), *APR Design Guide Home*
- Recoup (international), *Plastic packaging: recyclability by design*
- Wrap (European), *Design tips for making rigid plastic packaging more recyclable*

Other:

- A summary of studies conducted by COTREP and its members on the recyclability of plastic packaging in France:
 - > Cotrep (2016), *Recyclability of plastic packaging*
- For an overview of plastics recycling processes in Australia:
 - > VISY (2019), *Plastic - Education in Resource Recovery*

Disclaimer: This document has been developed by the Australian Packaging Covenant Organisation (APCO) with consultation from packaging manufacturers and experts in the waste and recycling industry. The document is intended to be general guidance only and the information contained within has been developed based on current knowledge at the time of publication.

Some information may not be relevant to all packaging types. For specific guidance on individual packaging items and to classify recyclability through kerbside recycling in Australia and New Zealand, please refer to the Packaging Recyclability Evaluation Portal (PREP). PREP is a living and dynamic platform that can be edited or expanded in consultation with a Technical Advisory Committee, as market and infrastructure adapt.

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