

DESIGNING FOR THE ENVIRONMENT

The essential how-to guide for all those involved in the development, design, marketing and procurement of packaging on how to design PET plastic packaging that works for your product and for our planet.

This document will be continually reviewed and updated to align with international best practice.

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FOREWORD

We live in a world where take, make, dispose-of is a way of life. But it is not sustainable. How we think, act and create needs to urgently transition to a circular economy within which waste becomes a resource.

This is often referred to as 'closing the loop' and it implies that products traditionally seen as waste are rather seen as resources which can be brought back into the supply chain after they've completed their original purpose. In this model, plastic packaging would never become waste; rather, it re-enters the economy as a valuable technical or biological nutrient.

The recycling of packaging does not begin with its collection, but rather with its design. Therefore, to maximise the recycling of plastic packaging, it is essential that retailers, brand owners, packaging manufacturers and designers embed recyclability principles into their pack design processes so that, at the end of its life, the packaging material can be successfully recycled and used again in new products and packaging.

Truly designing for the environment is about product stewardship, about forward-thinking initiatives, about innovation and breaking new ground to realise never-before-seen solutions.

The future of recycling within a circular economy begins with you.

INTRODUCTION

Climate change and sustainable development are two of the biggest issues facing today's society. It is therefore increasingly important for companies to reduce the environmental impacts of their products and services throughout their entire lifecycle; companies that fail to address environmental performance in product design and development will find it increasingly difficult to compete in a global market that is fast transitioning towards a circular economy. Packaging needs to be designed to satisfy more than just aesthetics – it needs to fulfil technical, consumer and customer needs in a manner that minimises environmental impact. This means that it needs to be designed and produced with the minimum amount of resources for purpose and, once it has completed its job, the scope for recovery maximised.

Around the world product stewardship and Extended Producer Responsibility (EPR) have become requirements for producers. In short, this means that the producer (which includes all sectors of the supply chain, including retailers and consumers) takes joint responsibility to deal with the product and all the waste it creates after its commercial life (i.e. cradle to cradle). The National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA, hereafter referred to as The Waste Act) makes this a legal requirement for all.

In South Africa, the approach to waste management is structured around the waste hierarchy (NWMS, 2011). The hierarchy comprises a number of levels, each representing an approach to waste management, arranged in descending order of priority:¹



¹ Department of Environmental Affairs (DEA) (2011), National Waste Management Strategy, Department of Environmental Affairs, Pretoria.

The Minister has the power to declare any waste which may be problematic as a priority waste. In this instance, the Minister will decide what to do with it e.g. through the placement of a material ban or a deposit on the container, etc.

See **Appendix 1** for more information on the evolution of waste management in South Africa.

DOCUMENT SCOPE

These guidelines focus on the design of PET plastic packaging to facilitate recycling. This represents a small yet important guide for the journey to sustainable production and consumption in South Africa.

Furthermore, these guidelines are driven by the requirements of the mechanical recycling process in South Africa specifically. In the future, some of the current restrictions (especially for barriers, opacity and colour) may need to be amended as new plants come into commercial operation.

The advice and tips contained in this document have been created to help producers and brand owners realise and appreciate that used PET material is far too valuable to be considered as trash, and to encourage the recycling of PET.

While this document does not provide a full strategic overview of all the known issues in PET packaging recycling, we acknowledge that guidance on designing for recyclability is one component of a large sustainability challenge, and we aim to share as much knowledge as possible.

There are wider issues of relevance, both in considering the overall environmental impact of differentiated PET packaging systems, and in developing efficient operational solutions to recycling and recovery of used PET plastic packaging.

It is noted that designing for recyclability is not something that can happen overnight, and that on-going work will be required by new and existing parties, including designers, manufacturers, waste and resource management professionals, and governments to address these developing issues. It is also important to note that since the packaging market is characterised first and foremost by “fit-for-purpose”, then affordability, there will be specific circumstances where the relationship between packaging production and recycling will continue to develop.

AIMS & OBJECTIVES

The aims of this document are to:

- (1) encourage designers, manufacturers of PET packaging, as well as brand owners and marketing teams, to consider the recycling possibilities of the products they're designing;
- (2) offer guidelines for those wishing to make their PET packaging more compatible with the existing recycling infrastructure in South Africa and therefore recyclable; and
- (3) provide everyone with adequate information to prevent their PET packaging from inadvertently interfering with existing PET plastic recycling streams.

Pursuit of these aims must be proportionate; the guiding principle for any PET packaging design should be 'fit for purpose'. The goal of improving recyclability of PET packaging cannot compromise product safety or interfere with product functionality. Furthermore, packs must be strong enough to protect the contents as best as possible throughout the supply chain. Lastly, improving recyclability should positively contribute to an overall reduction in the environmental impact of the total product offering.

However, brand owners should be weary of allowing functionality to excuse poor design, especially with new government legislation in mind. Packaging must be both functional **and** designed for end-of-life solutions like recycling.

It is also recognised that recyclability is only one measure of sustainability. While recycling is important as it can extend the life of valuable materials, reduce energy use, waste and litter, and cut greenhouse gas emissions, it is the full life cycle of the product – all environmental, social and economic benefits as well as negative impacts throughout the life of the product – which must be considered.

Following these guidelines will assist in matching societal expectations and company practices and increase market share by promoting the environmental features of a product to an environmentally conscious consumer.

Following these guidelines will also help companies demonstrate compliance linked to current legislation and, more generally, will demonstrate due diligence.

WHAT IS PETCO ASKING OF YOU?

PET plastic is 100% recyclable when basic design principles are followed. Simply put, we are asking you to follow the guidelines we have put in place to help ensure that PET plastic packaging does not cause recycling issues and has value far beyond its original intended purpose.

Existing plastic packaging companies, manufacturers of packaging and brand owners

are asked to review their current portfolio of PET packaging against these design guidelines, highlight any aspects where designs could potentially be improved and then implement the changes as soon as the opportunity presents itself.

New plastic packaging companies, manufacturers of packaging and brand owners are asked to integrate these guidelines into the design process at the very beginning to minimise cost and maximise the opportunity for compliance.

Please:

- Avoid the use of materials and/or components that are known to impede the PET recycling process or reduce the quality of the recycled PET.
- Reduce the amount of non-PET components to allow for ease of separation and efficiency of recycling.
- Include recycled PET packaging into your strategic planning.
- Design components, such as closures and labels, so that they can easily, safely, cost-effectively and rapidly be separated, and then eliminated from the recycled PET.
- Understand that the goal of improving the recyclability of PET packaging cannot compromise product safety.



NOT ALL PACKAGING IS CREATED EQUAL

WHAT TO LOOK OUT FOR

PET is extensively used for bottles but is also used in other packaging formats, e.g. thermoformed sheet for trays and punnets, strapping tapes, flexible packaging and transit packaging.

PET bottles make up approximately 70% of the total PET market in South Africa, with thermoformed trays, edible-oil bottles, jars, strapping and films accounting for the balance. PET trays and blister packs (alongside all plastic trays) are not currently collected and recycled in South Africa. This will be addressed soon. However, although not currently being recycled, packaging designers should still incorporate all the aspects to render the tray recyclable. For PET trays, moulds with specific polymer logos should not be used for other materials; for example, a mould with a No 1 PET insert cannot be used for No 5 PP, etc.

Here are the specifics of what to look out for when designing PET packaging.

1 - PACKAGING FORM

START EMPTY

Good packaging design can encourage reduced content waste. It should be possible to empty a pack so that only very little of the residual contents is left in the pack. This simplifies processing and recycling of the plastic packaging.

For PET bottles, wide necks allow the bottle to be placed upside down to drain all of the contents without any residue being left behind. This applies more to the “sauce” and similar segments of the market.

2 - MATERIAL TYPE

CHOOSE WISELY

Not all packaging materials can be recycled in South Africa.

Understanding which different polymers can be recycled in South Africa can drastically improve the design for recyclability. The aim is to minimise the number of different plastics used and to specify plastics that can be recycled together or easily separated in the recycling process.

- Combinations of different types of plastics with the same density ranges should be avoided; PET is heavier than water and will sink during one stage of the recycling process.
- During the PET washing process, caps or labels manufactured from polypropylene or high-density polyethylene (PE-HD) will float and can be easily removed.
- Avoid PVC as its similar appearance and overlapping range of densities with PET make the two polymers difficult to separate, often resulting in PVC contamination. This contamination (even at levels as low as ca50-200ppm) can render large amounts of PET useless for most recycling applications. For this reason, the use of PVC components of any kind with PET containers should be scrupulously avoided. These components generally include, but are not limited to closure liners, labels, sleeves and tamper-evident seals.
- Avoid PETG² (PET with glycol added) for similar challenges to PVC and especially given its lower melting temperature to PET, which renders it a contaminant.
- Other types of PET that share the same material identifier may cause problems in separation and conventional recycling.
- Other types of polymers that are sometimes substituted for PET include PLA, polycarbonate (PC) and rigid polystyrene (PS). Even the lowest levels of PLA in PET leads to haze and a deterioration of physical properties within recycled PET. See **Appendix 2** for more information on bioplastics and biodegradable plastics, and their recyclability.

² The State of California revised the state's definition of PET in 2017 to exclude PETG, meaning products made from the glycol-modified plastic are barred from using resin code No. 1. PETG which has a much lower melting point than PET, creating problems during the recycling process. AB 906 redefines PET by its melting point and material composition (Assembly Bill No. 906 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB906).

3 – MATERIAL IDENTIFICATION

KNOW YOUR SIGN

To facilitate the ease of visual identification of plastic types during manual separation, major plastic components should carry a material identifier, otherwise known as a polymer identification code (PIC).

- The PIC symbol should be clear, legible and moulded into the container so as to be easily identifiable.
- In the case of films, the PIC symbol should be lightly and repeatedly printed onto the material.
- Multilayer polymer composites should be marked with PIC '7'.
- Do not use the PIC 1 for PETG, PET/PE laminate, or PET with biodegradable laminates (refer to bullet point directly above).
- In exceptions, the PIC symbol can be located close to the base or printed on the label.

4 – COMPOSITE MATERIALS / BARRIER LAYERS

EFFECTIVE PROTECTION

- Other external coatings (e.g. O₂ or CO₂ barriers) can cause recycling issues. External coatings such as those that are applied to extend the shelf-life of products may sometimes cause recycling problems. If absolutely necessary to use a barrier, it needs to flake off the PET and be efficiently removed during granulation. Designers and converters need to select the correct combinations.
- Where performance-enhancing barrier layers are used that could interfere with current recycling (e.g. PET wine bottles), it is important to ensure that the container is easily distinguishable and sorted from conventional PET bottles and marked with a PIC '7'.
- If in doubt about permissible barrier layers and materials, verify with PETCO as well as the local PET recycler during the design stage of the bottle.

5 – ADDITIVES

ARE YOU ADDING FOR THE RIGHT REASON?

- The inclusion of nucleating and hazing agents, colours and fluorescent pigments, oxygen scavengers and other additives for visual and technical effects should be examined on a case-by-case basis for their impact on the overall plastic recycling stream. Such additives, which often (but not always) cause PET to discolour and/or haze, should be avoided unless means are readily and economically available to minimise their effect³.

³ Check with PETCO as additive companies have sometimes run tests in other jurisdictions. However, compatibility elsewhere does not necessarily denote compatibility with local recycling streams.

6 - COLOUR OF PLASTIC

IS BRIGHT RIGHT?

- Clear bottles have the highest commercial value for recycling. Very light blue bottles are also acceptable as they can be blended in small amounts with clear bottles.
- Green and brown bottles are also recycled but have a much lower value than clear bottles. Designers are encouraged to consider alternatives (e.g. perforated sleeves) if colour is absolutely necessary.
- Tubs and trays should be clear without the addition of any colourants.
- **Do not** print directly onto the bottle as it contaminates the PET and therefore deems the bottle unrecyclable. Note that minimal printing, for e.g. batch numbers, is acceptable but should be avoided if possible.

7 - CLOSURES / CLOSURE LINERS / CAP SLEEVES / SEALS

KNOW HOW TO CLOSE

- All closures, closure liners, puffers, inserts, caps, sleeves, and tamper-evident seals should be recyclable themselves.
- Use PP/PE-HD/PE-LD or PE-LLD for closures on PET bottles.
- For trays and blister packs, the plastic lid must be an integral part of the tray or at least the same plastic as the main body. Coated paper lids make separation very difficult.
- Avoid metal caps on bottles as they are difficult and costly to remove, which results in good bottles being rejected in sorting systems. Additionally, any residual metal not removed can damage machinery.
- Consider tethering your cap to the bottle.⁴

8 - LABELS AND ADHESIVES

STICK TO THE BASICS

- For bottles, sleeves and tamper-evident seals should be designed to completely detach from the container during the re-processing / washing phase of recycling.
- For trays, labels have a negative effect on recycling especially if they cannot be removed easily in water. Even if the labels can be separated, adhesive residue on the tray that is difficult to remove significantly impairs the quality of the recycle. Combinations of different plastics with a similar specific density, such as the combinations of PET and PVC, and combinations of plastics with other substrates render the packaging unrecyclable.
- The use of PET sleeves and labels with PET bottles is to be avoided.
- The use of PVC sleeves and labels with PET bottles is to be avoided.
- Paper labels are not ideal, especially on plastic film; they cause significant problems in conventional recycling.
- Polyethylene and polypropylene labels are preferred.
- Where adhesives are absolutely necessary, use those that are soluble or alkali-soluble at 60-80°C.
- For self-adhesive labels, use glue that is designed to stay on the label.
- Avoid foil tamper-evident seals that leave remnants of foil and adhesive.
- Metallised/foil labels on film are costly to remove, increase contamination and have the potential to devalue the collected material. They also increase the rejection rate in the sorting line and reduce the yield.

⁴ As the introduction of design requirements to connect caps to bottles has become a directive in Europe for producers of beverage bottles to implement before 2021, PETCO strongly advises local producers to follow suit: European Commission - Press Release: Circular Economy: Commission welcomes Council final adoption of new rules on single-use plastics to reduce marine plastic litter. Brussels, 21 May 2019 (http://europa.eu/rapid/press-release_IP-19-2631_en.htm)

9 – INKS

THINK BEFORE YOU INK

- Do not print directly onto the bottle as it contaminates the PET and therefore deems the bottle unrecyclable.
- For printing of batch or date information on the bottle, use lasers, in preference to ink jet or other printing, which uses no ink.

10 – OTHER COMPONENTS

FOR EFFECT OR EFFECTIVENESS?

- The use of other components of a different material (e.g. pour spouts, handles, etc.) is discouraged as they often increase the separation costs and reduce resin yield.
- Avoid metal springs / components, as found in trigger mechanisms.
- Avoid silicon seals.
- The use of RFIDs on bottles, labels, or closures is discouraged.
- Do not consider thermoformed In-Mould Labelling (t-IML) as the inclusion of these labels renders the PET unrecyclable.

11 – CLOSING THE LOOP

THE FULL CIRCLE STARTS WITH YOU

Designers, manufacturers of packaging, and brand owners should always consider the possibility of including increasing percentages of recycled PET plastic in their packaging. The specification of recycled materials in the design of new products supports the recovery of plastics by providing a market for reprocessed materials and reduces reliance on virgin materials. Advantages include a potential cost-saving, marketing benefits, and reduced environmental impact.

12 – SELF-DECLARED ENVIRONMENTAL CLAIMS

ISO⁵ (International Organization for Standardization) is the world's largest developer and publisher of International Standards. The 'ISO 14021:2016 Environmental Labels and Declarations: Self-declared Environmental Claims' Standard specifies requirements for self-declared environmental claims, including statements, symbols and graphics, regarding products.

The proliferation of environmental claims has created a need for environmental labelling standards that require consideration be given to all relevant aspects of the life cycle of

⁵ ISO, the International Organization for Standardization. www.iso.org

the product when such claims are developed.

Self-declared environmental claims may be made by manufacturers, importers, distributors, retailers or anyone else likely to benefit from such claims. Environmental claims made regarding products may take the form of statements, symbols or graphics on product or package labels, or in product literature, technical bulletins, advertising, publicity, telemarketing, as well as digital or electronic media, such as the Internet.

In self-declared environmental claims, the assurance of reliability is essential. It is important that verification is properly conducted to avoid negative market effects such as trade barriers or unfair competition, which can arise from unreliable and deceptive environmental claims. The evaluation methodology used by those who make environmental claims should be clear, transparent, scientifically sound and documented so that those who purchase or may potentially purchase products can be assured of the validity of the claims.

Seventeen selected claims are addressed in this standard:

COMPOSTABLE
DEGRADABLE
DESIGNED FOR DISASSEMBLY
EXTENDED LIFE PRODUCT
RECOVERED ENERGY
RECYCLABLE
RECYCLED CONTENT
PRE-CONSUMER MATERIAL
POST-CONSUMER MATERIAL
RECYCLED MATERIAL
RECOVERED [RECLAIMED] MATERIAL

REDUCED ENERGY CONSUMPTION
REDUCED RESOURCE USE
REDUCED WATER CONSUMPTION
REUSABLE
REFILLABLE
WASTE REDUCTION

See ISO's website for more information
(www.iso.org).



SUMMARY

GUIDELINE TABLE FOR PET BOTTLES

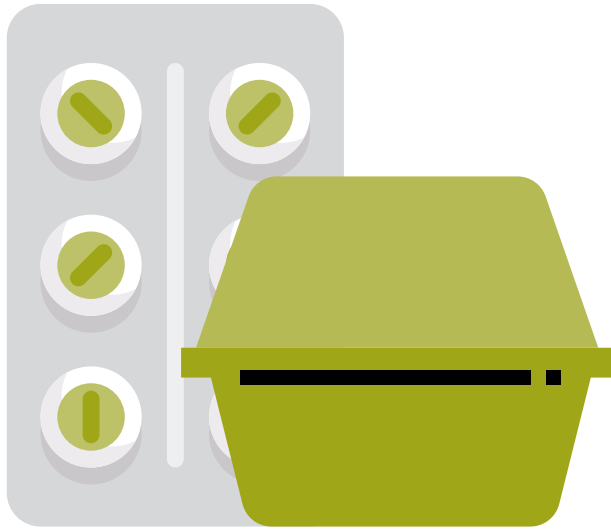
Green guidelines

Orange guidelines

Red guidelines

Green guidelines		Orange guidelines		Red guidelines	
YES. Compatible with recycling for most applications.		CONDITIONAL. Limited compatibility.		NO. Low compatibility i.e. not suited for recycling.	
PACKAGING		PET		PLA / PVC / PS / PETG	
	Colour	Transparent clear	Transparent light-blue	Other transparent colours / opaque / metallic / fluorescent colours / carbon black	
	BODY	Barrier / coatings	SiOx plasma-coating	Outer or inner layer coating	EVOH or PA monolayer blends Dual layer combination of different polymers Multilayer
Additives				O ₂ scavengers; UV stabilisers Acetaldehyde blockers Nanocomposites Oxo-biodegradable additives	
CLOSURE	Caps	Materials with densities less than 1g/cm ³ like PP/PE-HD/PE-LD		Materials with densities more than 1g/cm ³ e.g. PVC and PET Metals	
	Seals	Materials with densities less than 1g/cm ³ like PE, PP, BOPP		Materials with densities more than 1g/cm ³ like PVC, Al, Silicone, PS	
DECORATION	Direct printing	Do not print on bottles or jars unless production or expiry date, in which case use laser printing (minimally)		Direct printing on bottle or jar	
	Labels	Materials with densities less than 1g/cm ³ like PE, PP, BOPP	Self-adhesive labels where glues are designed to stay on the label when detached from the bottle	Materials with densities more than 1g/cm ³ like PVC, PS, PET Self-adhesive with improper glue i.e. glue does not stay on the label Metalised labels Paper labels	
	Sleeves (including tamper resistance)	Materials with densities less than 1g/cm ³ like PE, PP, BOPP	Shrink sleeve with perforation, with density less than 1g/cm ³	Materials with densities more than 1g/cm ³ like PVC, PS, PET, PETG Heavily inked shrink sleeve without perforation; full body sleeves without perforation Metalised materials	
	Adhesive	Water or alkali soluble in 60-80° C, designed to remain on the label	Hot melt alkali adhesives	Not removable or soluble in water	
	Ink	Good manufacturing practice - excluding heavy metal-containing inks Laser printing		Direct printing on bottle or jar	
OTHER	Trigger sprays	PE-HD/PE-LD PE / PP - HD / PE - LD / PP / uncoloured PET		Glass components Metal springs / ball bearings Coloured PET	

* Aligned with the European PET Bottle Platform, which is a voluntary industry initiative that provides PET bottle design guidelines for recycling, evaluates PET bottle packaging solutions and technologies and facilitates understanding of the effects of new PET bottle innovations on recycling processes. www.epbp.org.



SUMMARY

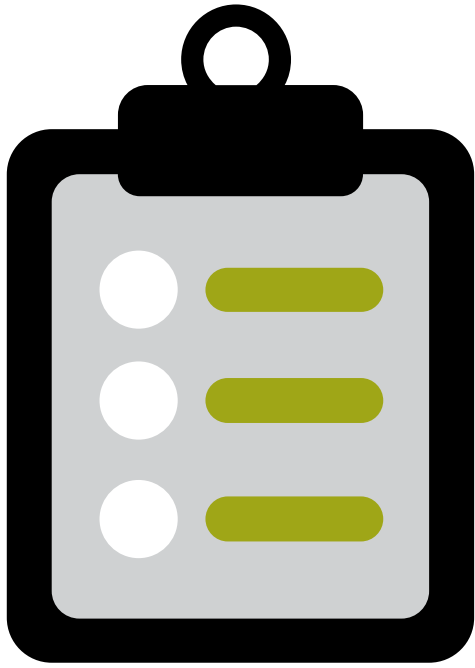
GUIDELINE TABLE FOR PET TRAYS AND BLISTER PACKS

Green guidelines

Orange guidelines

Red guidelines

YES. Compatible with recycling for most applications.		CONDITIONAL. Limited compatibility.		NO. Low compatibility i.e. not suited for recycling.	
PACKAGING		PET	Delaminating PET / PE / PET-GAG structure	PLA / PVC / PS / PETG / C-PET Any PET-based multi-layer material apart from delaminating PET / PE and PET-GAG Expanded PET	
	BODY	Colour	Transparent light-blue	Other transparent colours / opaque / metallic / fluorescent colours / carbon black	
		Barrier / Coatings	None	Inner or outer layer coating	EVOH or PA / any other barrier / any other oxygen scavenger
CLOSURE	Additives	Silicone surface coating (on coating area); Antiblocking masterbatch (max 3%)	Minimal silicone surface coating (de-nest)	O ₂ scavengers; UV stabilisers Acetaldehyde blockers Nanocomposites Oxo-biodegradable additives	
	Lid	Integral with container PET; floating combination of plastics with density less than 1 g/cm ³ (floating to be proven with sink/float test); in any case with no glue residuals (to be proven with glue removal test and oven test)	Peel-off lids if adhesive layer remains with lid Made of materials with densities less than 1g/cm ³ including PP / PE-HD / PE-LD	Peel-off lids where adhesive remains on container Made of PVC, PLA or any material with density greater than 1g/cm ³	
DECORATION	Direct printing	Do not print on tray unless production or expiry date, in which case use laser printing (minimally)		Direct printing on tray	
	Labels	Adhesives with 100% removing ratio and no adhesive residuals on flakes at 70 °C testing temperature Materials with densities less than 1g/cm ³ like PE, PP, BOPP	Self-adhesive labels where glues are designed to stay on the label when detached from the tub or the tray BPA-Free Paper label not losing fibres (pulping)	Materials with densities more than 1g/cm ³ like PVC, PS, PET Self-adhesive with improper glue i.e. glue does not stay on the label Metalised labels Paper labels losing fibres (pulping) or paper containing BPA	
		Adhesive	No adhesives on body	Water soluble adhesives Hot melt alkali adhesives	Any other adhesive
	Ink	Good manufacturing practice - excluding heavy metal-containing inks Laser printing		Direct printing on tray	
OTHER			PE / PE-HD / PE-LD/ PP/ uncoloured PET Paper - all inserts should be completely removable and leave no traces	PVC; PLA	



CONCLUSION

WHAT DO WE WANT YOU TO DO?

WHAT DO WE WANT YOU TO DO?

- Design PET containers with the environment, the recycling process, and the available recycling infrastructure in South Africa in mind. Sustainable recycling starts with a product that is designed to be compatible with the available collection and recycling infrastructure in South Africa and aligned with the end-use markets prevalent in our region.
- Include recycled content (rPET) in your packaging.
- Be transparent about your usage of rPET.
- Be transparent about the recyclability of your PET packaging.

UNSURE ABOUT ANYTHING? DON'T HESITATE TO GET IN TOUCH.

We strive to stay up to date and to share locally relevant case studies as far as design for PET recycling is concerned. If you have any stories in this respect, please email them to petconews@petco.co.za.

CONTACT US.

petconews@petco.co.za.

Sign up to our newsletter if you wish to receive periodic emails regarding PETCO news, events, recycling information: www.petco.co.za/keep-informed

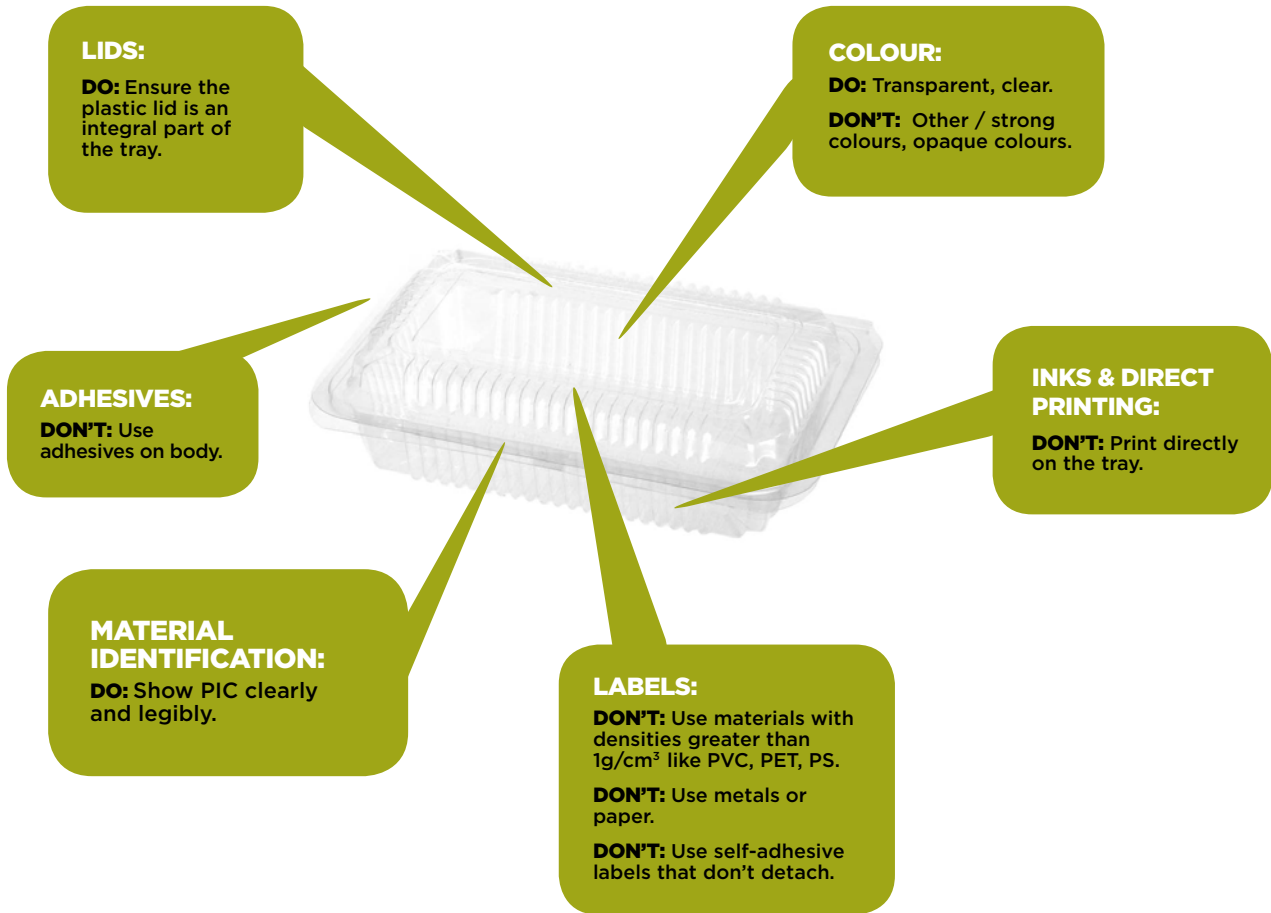
GOLD STANDARD:

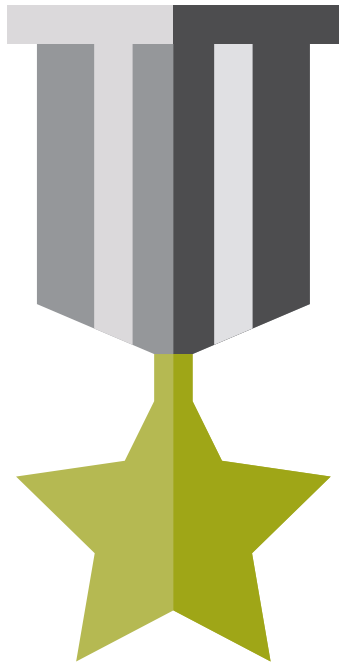
Here is a quick visual guide to help you improve the recyclability of PET bottles and trays.

HOW TO IMPROVE THE RECYCLABILITY OF PET BOTTLES:



HOW TO IMPROVE THE RECYCLABILITY OF PET TRAYS:





ACKNOWLEDGEMENTS

This document is adapted with permission from the RECOUP Recyclability by Design 2017 guideline document (www.recoup.org).



Thanks also to WRAP for their permission to use content from the publication WRAP (2018) Understanding Plastic Packaging:
<http://www.wrap.org.uk/sites/files/wrap/Understanding%20plastic%20packaging%20FINAL.pdf>



ABOUT PETCO.

PETCO (the PET Plastic Recycling Company NPC) works to fulfil the South African PET industry's role of Extended Producer Responsibility (EPR). EPR promotes the integration of environmental costs associated with PET products throughout their life cycles into the market costs of the products and shifts responsibility for the used packaging from government to private industry. We are financed by a voluntary EPR Fee paid by converters on PET resin purchased and grants from brand owners, resin producers and retailers.

WHAT WE DO.

PETCO works with the plastics industry, community members, municipalities, NGO's and entrepreneurs to create a more sustainable PET plastic recycling system.

We are committed to ensuring PET recycling in South Africa and have done so successfully for more than a decade by facilitating the following:

- Contracting and financing PET recyclers who buy baled bottles, process them, and manufacture feedstock for sale into the manufacturing sector;
- Consumer education and awareness (including schools and community groups);
- Training, skills development and joint venture projects (including those with municipalities) to grow and expand collection across the country, and to facilitate the integration of the informal economy into the formal one;
- Equipment support and sponsorship for collectors;
- Guidance relating to designing with the environment in mind (for industry), so that PET products put into the market are compatible with the recycling infrastructure available;
- Relating to this, a bottle grading system that easily informs consumers and industry of the recyclability of the bottle.

www.petco.co.za



GLOSSARY

Barrier layers: Protection layer from deterioration or admittance of moisture or other elements (such as oxygen and other gases) through the package material. Barriers can consist of an additive to the resin or a coating on the interior or exterior of the bottle.

Colour consideration: Light blue bottles (using base colour ALTO BLUE- DB52 at maximum 0.056%) are acceptable as they can be blended in small amounts with clear bottles.

Composite materials: A composite material is a material made from two or more constituent materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components.

Compostable: Compostable materials are materials that break down in composting conditions. Industrial composting conditions require elevated temperature (55-60°C) combined with a high relative humidity and the presence of oxygen, and they are in fact the most optimal compared to other everyday biodegradation conditions: in soil, surface water and marine water. Compliance with EN 13432 is considered a good measure for industrial compostability of packaging materials.

Degradable: A compound/material that is capable of being chemically degraded.

Deposition techniques: The act of applying a thin film to a surface is called thin-film deposition – any technique for depositing a thin film of material onto a substrate or onto previously deposited layers. “Thin” is a relative term, but most deposition techniques control layer thickness within a few tens of nanometres. Molecular beam epitaxy, Langmuir-Blodgett method and atomic layer deposition allow a single layer of atoms or molecules to be deposited at a time. Deposition techniques fall into two broad categories, depending on whether the process is primarily chemical or physical.

EVOH (Ethylene vinyl alcohol): A formal copolymer of ethylene and vinyl alcohol. The plastic resin is commonly used as an oxygen barrier in food packaging. It is better than other plastics at keeping air out and flavours in, is highly transparent, weather resistant, oil and solvent resistant, flexible, mouldable, recyclable, and printable. Its drawback is that it is difficult to make and therefore more expensive than other food packaging. Instead of making an entire package out of EVOH, manufacturers keep costs down by coextruding or laminating it as a thin layer between cardboard, foil, or other plastics. It is also used as a hydrocarbon barrier in plastic fuel tanks and pipes.

Hazing agents: Promotes the degree of cloudiness in a plastics material.

PE-HD (High Density Polyethylene): Any of various partially crystalline lightweight thermoplastics that are resistant to chemicals and moisture, have good insulating properties, and are used especially in packaging and insulation.

Home composting: Home composting creates conditions with much lower and less stable temperatures than industrial composting. There is no CEN standard for plastics that are suitable for home composting, but several countries have developed and applied national standards for testing and certifying of home compostable materials.

Fluorescers: A fluorescent substance used for whitening.

NIRS (Near-infrared spectroscopy): This is a spectroscopic method that uses the near-infrared region of the electromagnetic spectrum (from 780 nm to 2500 nm). It is based on molecular overtone and combination vibrations. Such transitions are forbidden by the selection rules of quantum mechanics.

Nucleating agents: Promotes the crystallization of semi-crystalline polymers. Some special nucleating agents produce spherulites so small that they do not scatter visible light, providing transparent polypropylene.

PA (polyamides): Polyamides (nylon) comprise the largest family of engineering plastics with a very wide range of applications. Polyamides are one of the major engineering and high-performance plastics because of their good balance of properties. Polyamides are very resistant to wear and abrasion, have good mechanical properties even at elevated temperatures, have low permeability to gases and have good chemical resistance, good dimensional stability, good toughness, high strength, high impact resistance, good flow.

PBAT and PBS (Polybutylene adipate terephthalate and Polybutylene succinate): Two biodegradable polyesters (Muthuraj et al 2014).

PET (Polyethylene terephthalate): A type of resin and a form of polyester; it is commonly labelled with the code on or near the bottom of bottles and other containers. PET has some important characteristics such its strength, thermo-stability, gas barrier properties and transparency. It is also lightweight, shatter-resistant and recyclable.

PHA (Polyhydroxyalkanoate): A naturally occurring family of biodegradable polyesters (NNFCC 2018).

PLA (Polylactic acid): A biodegradable polyester produced from lactic acid, used in wide range of serviceware products and as filament for 3D printing (NNFCC 2018). Industry example: PG Tips is using PLA for their tea bags (NNFCC 2018).

PLC (Polycaprolactone): A biodegradable polymer that is suitable for

applications requiring years of stability. In recent years it is becoming of increased interest to manufacturers of medical devices and drug delivery particles (polysciences.com 2018).

Post-used materials: Materials that have completed their initial purpose and can now be recycled.

Polymer: A substance, which has a molecular structure built up chiefly or completely from many similar units bonded together (plastic).

Polymer densities: A measurement of how dense a specific polymer is. In general, all polymers are very light in weight.

PP (Polypropylene): A synthetic recyclable polyolefin commonly used for margarine tubs, microwaveable meal trays, also produced as fibres and filaments for carpets, wall coverings and vehicle upholstery.

PTT (Polytrimethylene terephthalate): A type of polyester that differs from PET as it contains one more methylene group in the aliphatic chain that links the terephthalic moiety (European Commission Joint Research Centre 2013).

PVC (Polyvinyl Chloride): A polymer of vinyl chloride used especially for electrical insulation, films, and pipes.

Product Identification Code (PIC): A form of label that allows an individual to determine the composition of the product. Ideally it should be located on or near to the base of the product.

Recyclable: In PETCO's view, claims for recyclability should be supported by evidence of collection and re-processing at a meaningfully substantial rate.

Recycling: Material recycling is defined in European standard EN 13430 and EN 16848 (adapted from ISO 18604) as the reprocessing of a used product material into a new product. Plastic, which after use can be collected, sorted and reprocessed into new products is called mechanical recycling. Another option is chemical recycling where materials are broken down to monomers, which can be used again for the production of polymer.

RFID (Radio Frequency Identification): A form of wireless communication that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal or person.

Scavengers: Scavenger compounds absorb oxygen from head space of closed bottles and additionally prevent oxygen ingress into the bottle.

Starch blends: Most bio-based plastics are currently manufactured using starch as a feedstock (c.a. 80% of current bio-based plastics). The current major sources of this starch are maize, potatoes and cassava. Other potential sources include arrowroot, barley, some varieties of liana, millet, oats, rice, sago, sorghum, sweet potato, taro and wheat (BPF 2018).



APPENDICES

1 – A SUMMARY OF THE EVOLUTION OF WASTE MANAGEMENT IN SOUTH AFRICA

Waste Policy and Regulation in South Africa started with the Environmental Conservation Act (Act 73 of 1989⁶) as amended, which set out the requirements for the management of waste and provided the first legal definition of waste. Limited waste policy and regulation emerged between 1989 and 2007. With the publishing of the 1st National Waste Management Strategy⁷ (NWMS) and the White Paper on Integrated Pollution and Waste Management⁸ (IP&WM), the stage was set for what was to follow. The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008; NEM: WA⁹) then came into effect on 1 July 2009, after which the Minister of Environmental Affairs then established the National Waste Management Strategy (NWMS¹⁰) in terms of Section 6(1) for achieving the objects of the Act. The NWMS was approved for implementation by the Cabinet in November 2011.

The management of waste in South Africa has been based on the principles of the waste management hierarchy¹¹ (see below) from early waste policy and entrenched in recent waste legislation. The adoption of the hierarchy has been in the policy since 2009, but the management of waste has not necessarily followed the hierarchal approach. It is only as a result of the promulgation of the NEM: WA and finalisation of the NWMS that the implementation of the hierarchy approach was prioritised.

6 Republic of South Africa. Environment Conservation Act 73 of 1989. Government Gazette No. 11927, Notice No. 1188. 1989. Available online: https://www.environment.gov.za/sites/default/files/legislations/environment_conservation_act73of1989.pdf

7 Department of Environmental Affairs and Tourism (DEAT). National Waste Management Strategies and Action Plans South Africa; Strategy Formulation Phase. National Waste Management Strategy, Version D; DEAT: Pretoria, South Africa, 15 October 1999

8 DEAT (Department of Environmental Affairs and Tourism). White Paper on Integrated Pollution and Waste Management for South Africa. A Policy on Pollution Prevention, Waste Minimisation, Impact Management and Remediation. Government Gazette No. 20978, Notice No. 227. 2000. Available online: https://www.environment.gov.za/sites/default/files/legislations/integrated_pollutionand_wastemanagement_0.pdf

9 https://www.environment.gov.za/sites/default/files/legislations/nema_amendment_act59.pdf

10 <https://www.environment.gov.za/documents/strategicdocuments/wastemanagement>

11 https://www.environment.gov.za/sites/default/files/docs/series12_environmental_managementplans.pdf

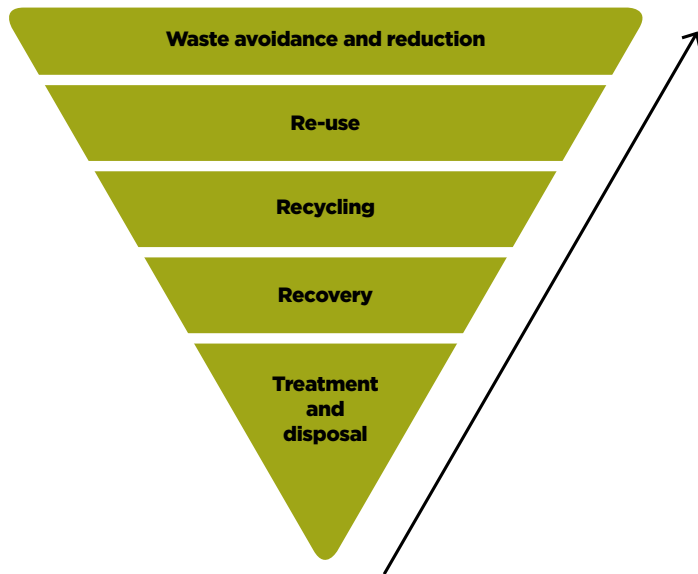


Figure 1:
Waste management hierarchy
as per the National Waste
Management Strategy
Source: DEA (2012a)

The National Pricing Strategy for Waste Management (NPSWM¹²) was then published in 2016 under the NEM: WA as the framework within which waste management charges will be set in South Africa. The NPSWM recognises that there is currently an underpricing of waste services. This does not encourage waste generators and holders to reduce waste generation or to re-use, recycle or recover waste, but rather perpetuates the use of landfill which is perceived as the cheapest method of waste disposal.

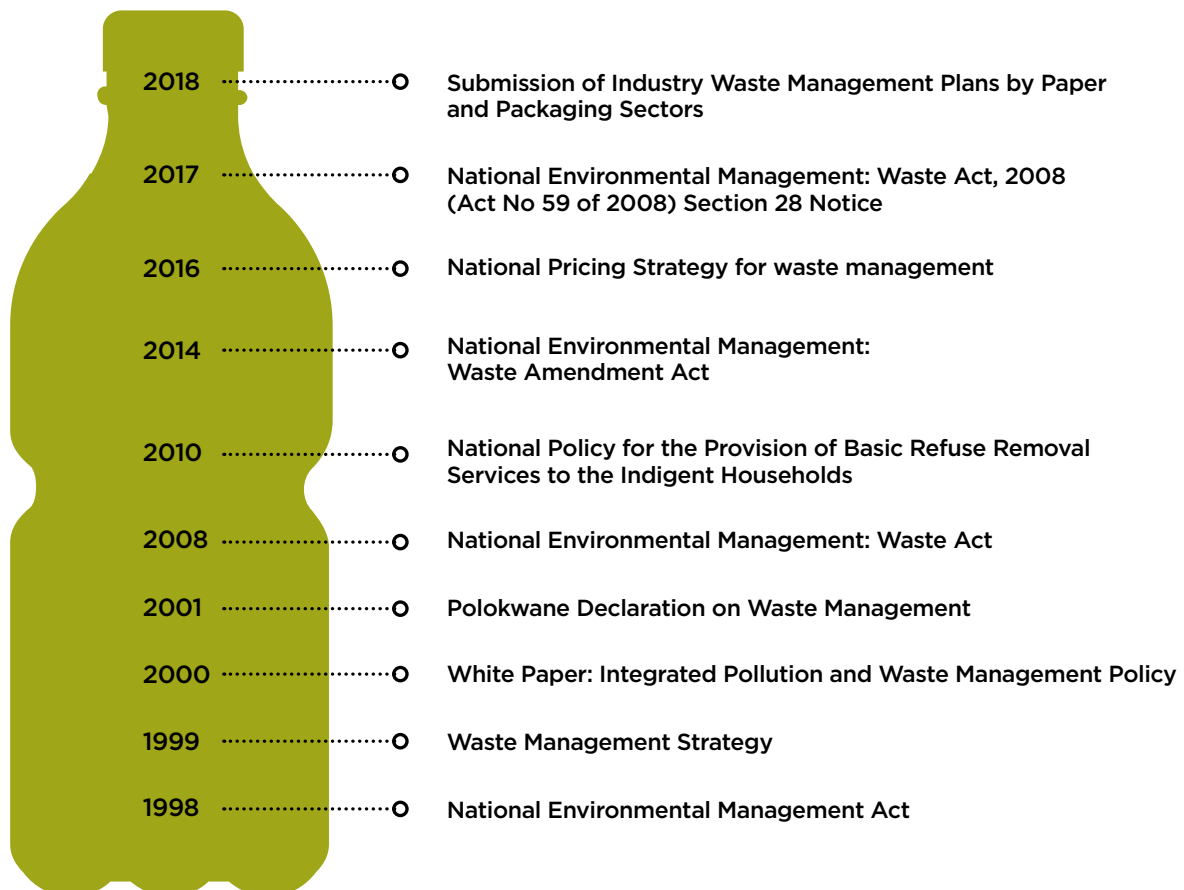
The NPSWM contains a methodology and approach for waste management charges to be applied in South Africa. It outlines possible waste management charges or economic instruments that may be applied in accordance with the overall fiscal and taxation policy of South Africa.

Subsequent to this, the National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) Section 28 Notice was published on 6 December 2017 with paper and packaging declared a priority waste by government. Each packaging waste stream was required to submit an Industry Waste Management Plan (IndWMP) to the Minister by September 2018, indicating how the paper and packaging industry will deal with its extended producer responsibility, decrease packaging in the environment, create employment and bring about transformation, amongst other aspects.

¹² <https://www.gov.za/documents/national-environmental-management-waste-act-national-pricing-strategy-waste-management-11>

The following legislation is applicable to waste management in South Africa:

EVOLUTION OF THE WASTE MANAGEMENT POLICY IN SOUTH AFRICA



2 – THE FACTS: BIOPLASTICS, BIODEGRADABLE PLASTICS & THEIR RECYCLABILITY¹³

The way a plastic is designed to behave alongside what material it's made from, affects what it can be used for as well as how it can be recycled and disposed of at the end of its life.

Plastic can be made from fossil-based or bio-based materials. Both can be used to make highly durable, non-biodegradable plastics, or plastics which either biodegrade or compost. The nature of the material used to make a plastic or the term used to describe it does not necessarily dictate the way it will behave at the end of its life e.g. a bio-based plastic or bioplastic does not automatically mean it will biodegrade.

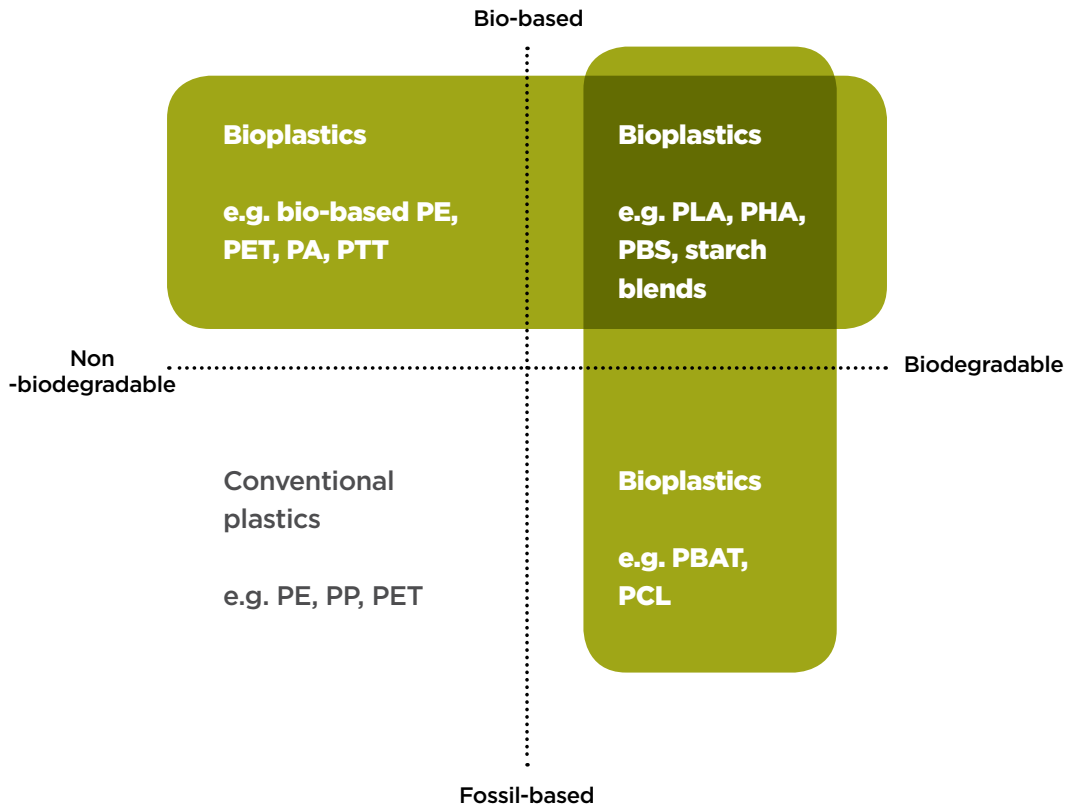
This diagram demonstrates the complexity of the term bioplastics; which refers to a diverse family of materials with differing properties – there are three main groups: Bio-based or partially bio-based non-biodegradable plastics such as bio-based PE or PP; Plastics that are both bio-based and biodegradable, such as biodegradable PLA and PHA or PBS; Plastics that are fossil-based and biodegradable, such as PBAT.

This diagram demonstrates the complexity of the term bioplastics; which refers to a diverse family of materials with differing properties – there are three main groups:

1. Bio-based or partially bio-based non-biodegradable plastics such as bio-based PE or PP;
2. Plastics that are both bio-based and biodegradable, such as biodegradable PLA and PHA or PBS;
3. Plastics that are fossil-based and biodegradable, such as PBAT.

See glossary for acronyms.

¹³ Extracted and used with permission from WRAP (2018) Understanding plastic packaging <http://www.wrap.org.uk/sites/files/wrap/Understanding%20plastic%20packaging%20FINAL.pdf>



Bioplastics diagram is based on the European Bioplastics version <https://www.europeanbioplastics.org/bioplastics/materials/>

MATERIAL TYPE

Fossil-based plastic

Made from a wide range of polymers derived from petrochemicals. Fossil-based plastic packaging is generally long lived, durable and non-biodegradable. These are referred to as conventional plastics. However, fossil-based plastic can also be designed to biodegrade.

Bio-based plastic

Made using polymers derived from plant-based sources e.g. starch, cellulose, oils, lignin etc.

Bio-based plastic is the term used for any plastic made from bio-based polymers and refers to the source from which the plastic is made, not how the material will function.

Bio-based polymers can be used to make plastic packaging that behaves like conventional plastic and is long-lived, durable and non-biodegradable. It can also be used to make biodegradable and compostable plastics. Both types are referred to as bioplastics.

BEHAVIOUR AND FEATURES

All plastics, regardless of whether they are fossil-based or bio-based, can be designed to behave in three ways:

Non-biodegradable

Is durable and lasts for years.

It has high strength and can be used in low weight applications.

Biodegradable

Breaks down in a defined period of time.

It can now be made with similar strength, plasticity and elasticity properties of non-biodegradable plastics, and made into products using the same technologies (e.g. film processing or moulding).

The fact that a plastic is described as biodegradable does not mean that it should be freely released into the environment in an uncontrolled manner. The speed, method and nature of biodegradation differs between materials and users should question the behaviour of biodegradable materials before using them in any application.

Compostable

Can meet EN13432 or a comparable standard for compostable packaging so that the material decomposes and biodegrades in industrial composting conditions. Materials that meet an appropriate home composting standard can be composted in home composting systems.

It can have similar strength, plasticity and elasticity properties to non-biodegradable plastics and can be made into products using the same technologies (e.g. film processing or moulding).

Importantly, not all biodegradable plastic is compostable, but all compostable plastic is biodegradable.

SUITABILITY FOR RECYCLING

The way a plastic is designed to behave dictates its suitability for recycling – not whether it is fossil-based or bio-based.

Non-biodegradable

Non-biodegradable packaging plastics can be recycled, if collected and sorted into separate material reprocessing streams.

The route for recycling or disposal must not compromise other recycling routes. Biodegradable plastics entering the recycling stream will contaminate the recyclate.

Biodegradable

Currently, biodegradable plastics cannot be recycled in the same way as non-biodegradable plastic.

It must be separated from non-biodegradable plastic streams and dealt with separately. If not, it causes problems during the recycling process.

Biodegradable packaging needs to be clearly labelled and easy for citizens to identify, separate and correctly dispose of. The route for treatment and disposal must not compromise other existing recycling routes. Biodegradable packaging can only be composted when it meets the appropriate composting standard. South Africa does not currently have commercial facilities that can handle biodegradable packaging.

Compostable

Compostable plastics can be composted at industrial scale composting facilities or, in some cases, may be suitable for home composting. It is vital that only compostable plastics are sent to these routes as non-compostable plastics can contaminate the final compost produced.

Compostable plastic packaging needs to be clearly labelled and easy for citizens to identify, separate and correctly dispose of in an appropriate collection and recycling scheme for compostable plastics. The route for recycling compostable packaging must not compromise non-biodegradable recycling routes. Non-biodegradable plastics entering the composting processes can contaminate the final product.

ENVIRONMENTAL IMPACT

Any plastic that evades appropriate collection and treatment that escapes into the environment has the potential to have a long-lasting impact on the environment.

Non-biodegradable plastic packaging

Conventional plastic debris has been shown to accumulate in inland waters and marine environments. The impact of this is now being widely discussed.

There is very limited information on the impact of conventional plastic in soil-based environments, though it is clear that plastic fragments will persist for long periods of time.

Biodegradable and compostable plastic packaging

There is a lack of clarity concerning standards that define the biodegradability of biodegradable or compostable plastics in any environment. There is a particular lack of evidence on the behaviour of these materials in water, and there is a need to understand biodegradation at lower temperatures. Therefore, it is very difficult to accurately assess environmental impact of the biodegradable and compostable plastic packaging. Composting is only taking place at temperatures exceeding 60 degrees Celsius.

CARBON FOOTPRINT OVER LIFE CYCLE

Life Cycle Assessment is a complex technique to quantify the environmental impact of a single product over its entire life cycle.

For greenhouse gas emissions from all types of plastic, studies show that raw material extraction, production, and waste disposal, contribute most to emissions. Bio-based plastics usually have a lower carbon impact in their extraction and production phase.

Where conventional plastics enter 'energy to waste' facilities, they emit greenhouse gases, which can be higher than combusting coal or natural gas to generate the same amount of energy. Within landfills they are considered inert.

The opposite is true for biodegradable plastics, which has the potential to give rise to methane under landfill conditions, but in energy recovery are considered carbon neutral (short cycle emissions).

Compostable plastics contribute to compost structure but contain no nutrients (NPK).

For all plastics, recycling generates the lowest emissions at end of life (WRAP).

3 – FREQUENTLY ASKED QUESTIONS ABOUT PET AND PACKAGING

The Role of Packaging

Packaging allows us to consume products in ways that would be difficult – if not impossible – without it. Specifically, packaging:

- protects vulnerable products from damage while in transit and from contamination or damage by moisture, humidity, gases, micro-organisms, insects and light;
- allows the product to be transported over great distances, used, and stored by consumers;
- saves space through stacking objects, making transport more efficient;
- maintains quality and food safety by preventing tampering or spoiling;
- displays important product information, such as nutritional content, allergy advice and manufacturer details.

The product contained within the packaging often has a higher carbon footprint than the package itself, and thus it is vitally important to protect the contents to prevent waste of resources and reduce CO₂ emissions.

Without packaging, we would not be able to purchase liquids, gels, powders or out-of-season fruit. We would have significant problems with food safety and hygiene. Food wastage would increase, with negative environmental impacts.

Increased urbanisation, improved living standards, lifestyle changes and increased mobility all place greater requirements on our food and product systems to be durable and affordable.

Plastic packaging in particular is an important enabler of the modern economy. The range of plastic packaging has extremely useful properties which makes it well-suited to its purpose.

Environmental Benefits of Plastic Packaging

Calls to ban plastic packaging are often made in response to the environmental problems associated with poorly managed waste streams, but do not consider the many environmental benefits that plastic packaging has. Some of these benefits include:

- **Light weight:** Plastic packaging is lightweight, which means lighter loads for planes and trucks, which saves energy and carbon emissions associated with transporting products.
- **Resource efficient:** Plastic packaging saves packaging mass, energy and CO₂ emissions. Without it, we would use two to three times more resources.
- **Reduced material use:** The amount of plastic needed for packaging decreases as manufacturers continually innovate to reduce the material needed for manufactured packaging.
- **Safe and hygienic:** Plastics are hygienic, shatterproof, and safe – even for rough handling. Plastics keep products free from contamination (particularly useful for medical packaging e.g. sterile syringes). Plastic can be sealed shut or moulded into a safety mechanism e.g. child-proof locks on medication.
- **Versatile:** Plastics can be transformed in many ways – blown, injected or thermomoulded – which means it can be used to package sauces and pastes.
- **Recyclable:** There are subsets of plastic packaging that can be recycled many times to create new products.

In addition to this, there are some products that are more convenient to use in plastic packaging whether that be for pouring, handling, or storing. Packaging and plastic packaging offer so many benefits that life as we know it would not be practical without it.

What is PET? What other kinds of PET are there?

PET forms the basis for synthetic fibres like polyester and is also recognised in the packaging industry as the rigid plastic commonly used as beverage bottles for carbonated soft drinks, bottled water, milk, juice, sports and energy drinks, jars, punnets, tubs and trays for food items, bottles for household, personal care and pharmaceutical products, and sheet and film for general packaging.

Other forms of PET include:

- APET - Amorphous PET;
- REFPET - Refillable PET;
- NRPET - Non-returnable PET;
- Bio PET - PET resin manufactured from the same petro-sourced element - terephthalic acid - but this time from bio-sourced ethylene glycol i.e. the ethylene glycol is obtained from plants (for example sugar cane, sugar beet) by different thermo-chemical processes (also called 'bio-sourced PET');
- Biodegradable PET - PET that will degrade under certain conditions i.e. in biologically-active environments;
- rPET - Recycled PET;
- vPET - Virgin PET.

Why PET Plastic Bottles are not Trash.

Because they can be recycled and used again and again

PET packaging can be made from up to 100% recycled PET, recapturing both the material and the inherent energy of the original package. PET can also be recycled multiple times. Since PETCO's inception in 2004, over 14 billion bottles have been collected for recycling. Refer to the PETCO website for the latest stats (www.petco.co.za).

Because they can be made into new useful products

Collected PET is processed and re-manufactured into a variety of new materials including fibre and new PET packaging. Since PETCO's inception in 2004, we've helped to create over R5.4 billion worth of new products containing recycled PET (rPET).

Because collecting them creates jobs

Plastic bottles are valuable and create income opportunities for informal collectors. If one person collects 200 bottles for 240 days of the year, it amounts to 1 450 kilograms per year.

Because collecting them is good for the environment

Recycling PET bottles has saved over 900 000 tonnes of carbon and avoided using almost 4 million m³ of landfill space to date. Recycling plastic bottles decreases the need for raw materials and saves energy.

What is PET Plastic Recycling?

PET bottles are made of one of the few polymers that can be recycled into the same form – a new beverage bottle – again and again. This closes the recycling loop and enables ‘cradle to cradle’ packaging solutions. PET bottler recycling in South Africa, which PETCO is responsible for, is doing very well. Refer to the PETCO website for the latest stats (www.petco.co.za).

PET Plastic Recycling in South Africa.

In South Africa, recycled PET (rPET) can be used to make many new products, such as polyester staple fibre used for apparel (clothing), home textiles (duvets, pillows, carpeting), automotive parts (carpets, sound insulation, boot linings, seat covers), industrial end-use items (geotextiles and roof insulation), strapping, fruit carton corner pieces, and new PET packaging and bottles for both food and non-food products. It is generally blended in a ratio of virgin to recycled PET, depending on the application required.

From PETCO’s perspective, the production and use of both food grade and non-food grade rPET resin remains the major growth opportunity for PET recycling in South Africa.

The use of rPET in food-grade PET packaging entails compliance with extremely stringent standards of health, safety and product quality. It represents the most sustainable use of the raw material by ‘closing the loop’ where the recycled resin can be used repeatedly in new bottles, using less resources, saving forex, and maximising the use of resources already extracted.

Regarding specific end-uses for rPET, clear and light blue bottles can be used for any end-use (food-grade, fibre, geotextile and strapping). Food-grade recycling can only use clear bottles at the moment. Green and brown bottles can be used for fibre, geotextiles or strapping. Luminous or opaque are not readily recycled as there are no end-use markets for them (they also cause blockages at the recycling plant). Thermoforms may be suitable for selected fibre grades and for strapping. However, more development work is still needed in this regard.

PETCO and its recycling partners continue to investigate new end-uses for post-consumer PET material, with a number of projects in various stages of commercial and pre-commercial development.

What is Bottle-2-Bottle Recycling, and why is it so important?

Bottle-2-Bottle capacity for carbonated soft drink (CSD) grade resin represents the most sustainable use of the raw material by 'closing the loop' where the recycled resin can be used repeatedly in new bottles. Two Bottle-2-Bottle PET recycling plants - Kronos and Starlinger, both Coca-Cola-approved - have now opened. PETCO's contracted financial assistance, based on the volume of bottles recycled, contributed to making these projects possible, and PETCO's on-going support will ensure that these projects do not fail, where other similar initiatives have in the past.

We are closing an important PET recycling loop and are proud to be the first African country to do so.

Why choose PET?

Manufacturers use PET to package products because of its strength, thermo-stability, and transparency. PET is light (up to 3.5 x lighter than alternatives, which reduces costs and carbon emissions relating to transportation), hygienic, shatterproof, re-sealable and 100% recyclable when basic design guidelines are followed. Retailers use PET because it promotes high product visibility: its lightweight characteristics facilitate shelf-stacking, and its shatterproof quality ensures safety, product integrity and a reduction in breakages.

Consumers choose PET because it is portable, lightweight, re-sealable for efficient on-the-go hydration, 100% safe and 100% recyclable.

From an environmental perspective, two points are key:

- PET is the most recycled packaging polymer on the shelves;
- The weight of PET packaging has reduced by more than 30% over the past 10 years.

PET is a widely used and its use is growing.

Is PET safe?

There has been much confusion about the safety of PET after concerns were raised about the safety of a different kind of plastic, namely the polycarbonate products containing bisphenol A (BPA) which are most often used to make re-usable rigid containers and electronic devices. There is no connection between PET plastic and BPA.

BPA is not used in the production of PET material, nor is it used as a chemical building block for any of the materials used in the manufacture of PET.

Phthalates (pronounced Tha-lates) are a class of chemicals that include three subsets, each with different properties. Polyethylene terephthalate (PET) belongs to one of these phthalate subsets, but not the one most commonly associated with the term. Orthophthalate is the phthalate subset most commonly referenced and discussed in popular literature and on internet sites, and which has been the subject of some negative press. Often used to make various plastics more flexible, this type of phthalate

is also called a plasticiser. PET does not contain plasticisers or orthophthalates. Plasticisers are never substituted for terephthalates used in the manufacturer of PET, nor are the two ever mixed. Current research shows that PET does not contain or leach oestrogen-like chemicals such as BPA or other endocrine disrupters.

How can we improve recycling rates?

Improving recycling rates needs to be done on multiple fronts. From a consumer and citizenry perspective, actions include:

- Demanding packaging containing recycled content from brand owners and retailers. Demand for recycled material is the enabling mechanism for recycling to occur in the first place and ultimately increase.
- Purchasing products that are recyclable, and pressuring brand owners and retailers to indicate on the product whether packaging is recyclable.
- Lobbying for separation-at-source schemes to be implemented and part-taking in and encouraging others to take part when these are in place. Success of these schemes depends largely on household participation.

Showing your support for organisations and companies who are making recycling happen will further encourage others do to the same.



CONTACT US



Supporter of Plastics | SA
Supporter of Packaging | SA

 **0860 147 738**

 **info@petco.co.za**

PET Recycling
Company (NPC)
PO Box 680
Constantia, 7848

CAPE TOWN

Phone **+27 (21) 794 6300**
Fax **+27 (21) 794 1724**

1st Floor, ICR House
Alphen Office Park
1 Constantia Main Road
Constantia

JOHANNESBURG

Phone **+27 (11) 615 8875**
Fax **+27 (11) 615 8874**

Unit 3, Parade on Kloof
132 The Parade, Oriel
Bedfordview

