



Design for Recycling (D4R)

Polyco  D4R Guidelines



PP

Polypropylene (PP) Packaging



Why Design Products for Recyclability?

As a packaging designer, you play a key role in creating packaging that is good for the product, good for people, and good for the planet.

These Design for Recycling (D4R) guidelines have been created to help you to make the best decisions when choosing how to design packaging that keeps the planet in mind. Designing packaging that can be easily recycled keeps that packaging out of landfill and out of the environment. Recyclable packaging re-enters the recycling value chain and can be used again and again, protecting and preserving the natural world.

These guidelines show you which materials are best to use, which materials should be avoided, and what quality criteria to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

Designing packaging for recyclability does not mean that you have to sacrifice quality or performance. By using these guidelines you will see that you can achieve high quality packaging and recyclability at the same time.



Polypropylene (PP) Packaging

BASIC PRINCIPLES

Ideally:

- ✦ Natural or white.
- ✦ Caps, closures and other components in PP.
- ✦ Labels that can be removed easily.
- ✦ Water-soluble adhesives.
- ✦ PVC or PET shrink sleeves.
- ✦ All HDPE components (caps, labels, handles and other) must be less than 5% of container weight.

Avoid:

- ✦ Silicone gaskets.
- ✦ Metal closures or inserts.
- ✦ PET or Nylon webbing, zips or components.





Contents

- 1** Injection Moulded Crates, Buckets and Tubs **04**
- 2** Blow Moulded Bottles and Jars with Injection Moulded Caps and Closures **06**
- 3** Extruded Film and Bags **08**
- 4** Extruded Tapes, Bags and Sacks (woven and non-woven) **10**
- 5** Thermoformed Trays **12**
- 6** Extruded Tubes **14**

1

PP Crates, Buckets & Tubs

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your PP crates, buckets and tubs are designed to be recycled.

Ideally:

- ✦ Polymer should be natural or white.
- ✦ All components should be PP, including lids and handles.
- ✦ Label adhesives should be water-soluble.
- ✦ Use shrink-labels.

Avoid:

- ✦ Metal handles or inserts.
- ✦ Large sticky labels.

QUALITY CRITERIA

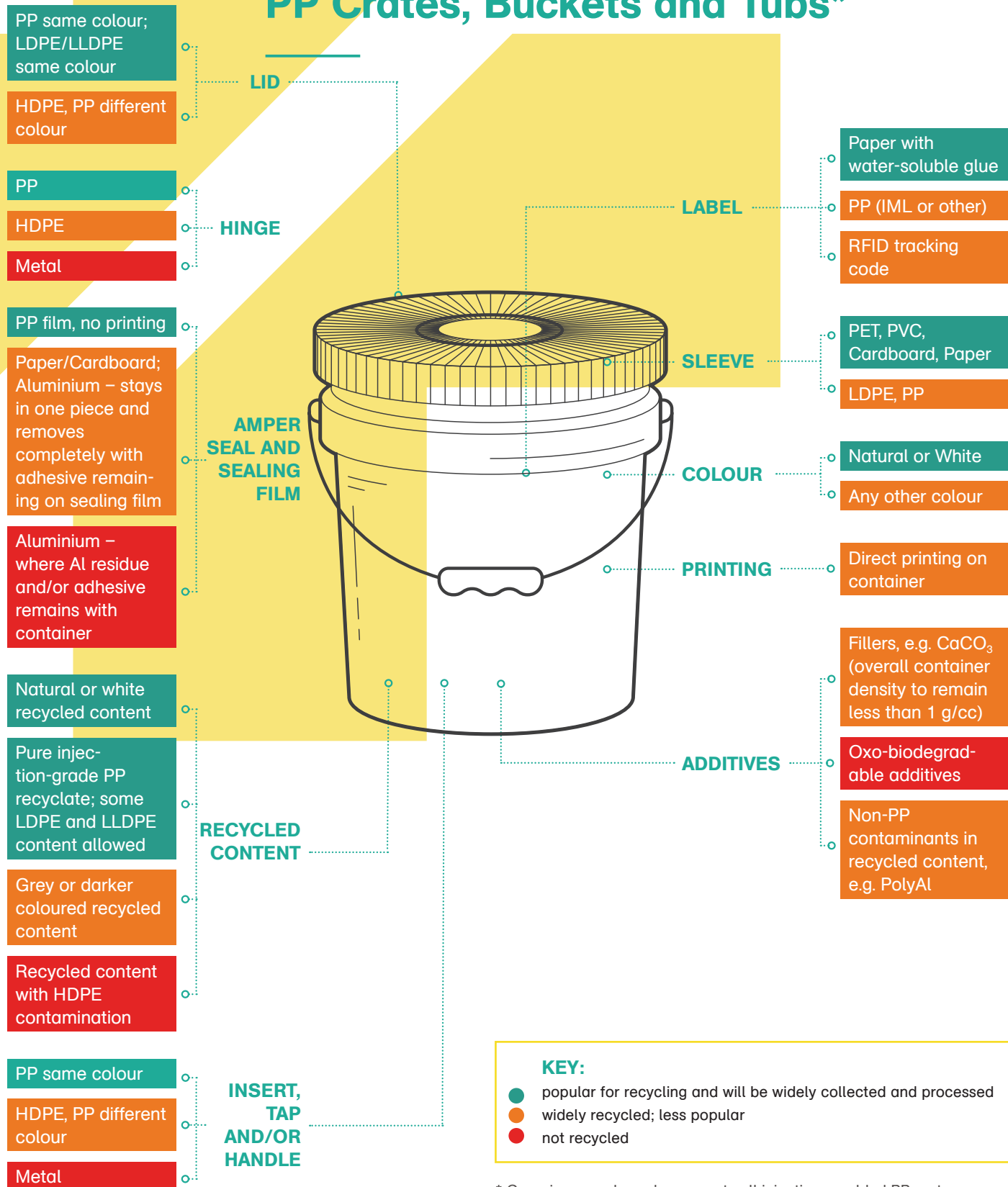
Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- ✦ White, cream or natural coloured products give a light-coloured recyclate.
- ✦ Light-coloured recyclate can be used for light-coloured or pigmented packaging products.
- ✦ Printing, shrink sleeves (of the same density) or IML's cancel the light colour and result in dark grey or black recyclate.
- ✦ Dark recyclate can only be used for black products.
- ✦ The colour and the strength of the polymer deteriorate with every recycling cycle.
- ✦ Only injection grade regrind to be used; extrusion grade addition must be limited to 10%.
- ✦ Ensure legible and correct material identification codes are moulded on all components.





PP Crates, Buckets and Tubs*



* Generic example and represents all injection moulded PP crates, buckets and tubs

2 PP Bottles and Jars; Caps and Closures

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your PP bottles and jars, caps and closures are designed to be recycled.

Ideally:

- ✦ Natural or white.
- ✦ Labels that can be removed easily.
- ✦ Water-soluble adhesives.
- ✦ PP caps and closures of same colour.

Avoid:

- ✦ Silicone gaskets.
- ✦ Metal closures or inserts.
- ✦ HDPE contamination.

QUALITY CRITERIA

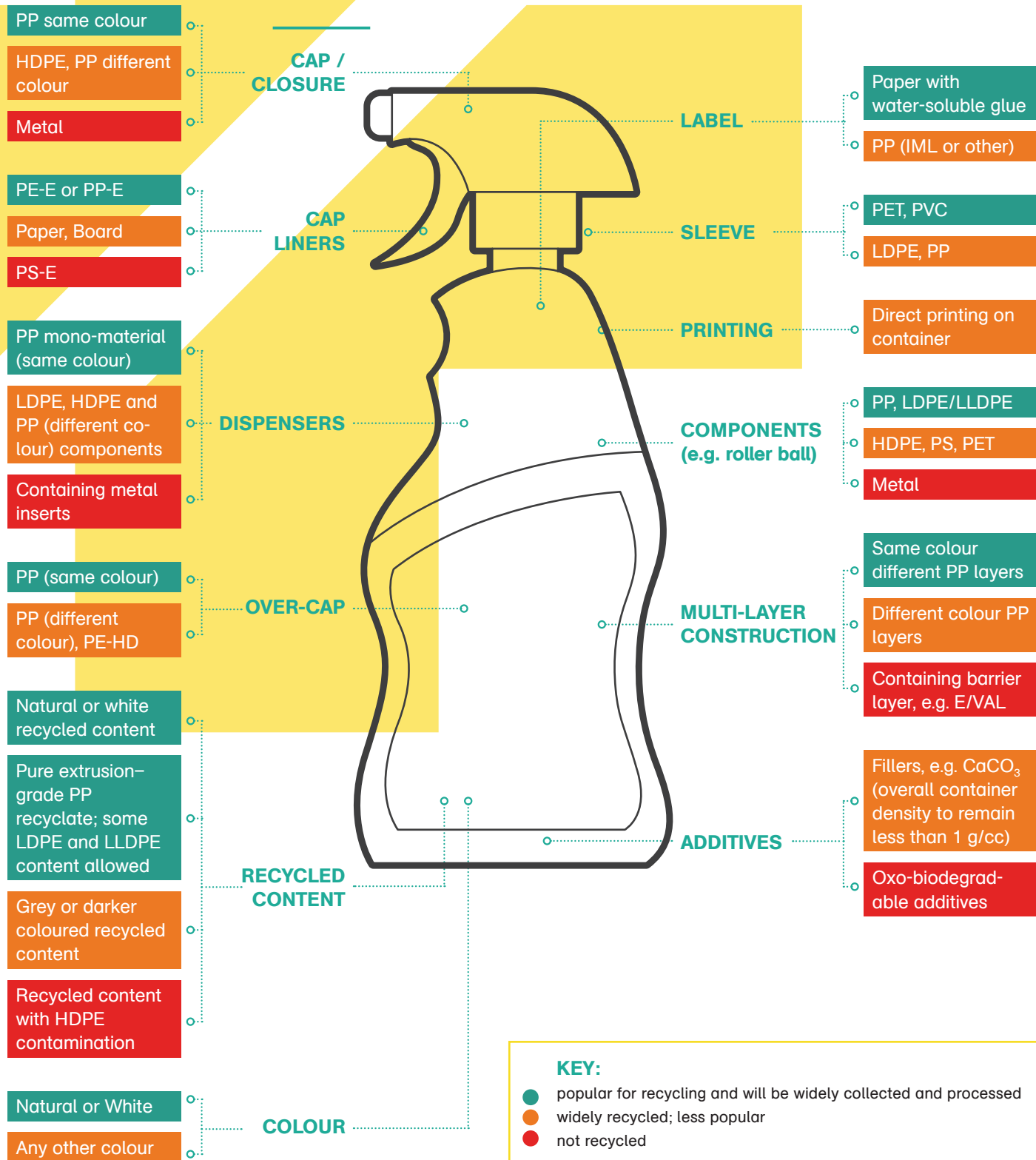
Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- ✦ Natural, white or cream coloured products give a light-coloured recyclate.
- ✦ Light-coloured recyclate can be used for light-coloured or pigmented packaging products.
- ✦ Printing, shrink sleeves (of the same density) or IML's cancel the light colour and result in dark grey or black recyclate.
- ✦ Dark recyclate can only be used for black products.
- ✦ The colour and the strength of the polymer deteriorate with every recycling cycle.
- ✦ Only blow moulding and extrusion grade regrind to be used for bottles and injection grade for injection blow moulded containers.
- ✦ Limit recycled content in hinged closures to maintain functionality.
- ✦ Ensure legible and correct material identification codes are moulded in on all components.





PP Bottles, Jars and Closures*



* Generic example and represents all PP bottles, jars, and closures

3

PP Film and Bags

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your PP films and bags are designed to be recycled.

Ideally:

- ✦ Should be clear.
- ✦ With no printing.
- ✦ Large bags and formats.
- ✦ Labels with water soluble adhesives.

Avoid:

- ✦ Heavy print in dark colours.
- ✦ Big, sticky labels.
- ✦ Small tear-off corners and strips.

Notes:

- ✦ Very small packaging items will only be “picked” up by waste collectors if part of a separation at source initiative, they are not desirable.
- ✦ Residual oily content adds considerable cost to recycling process.
- ✦ Contamination risk of PLA films.

QUALITY CRITERIA

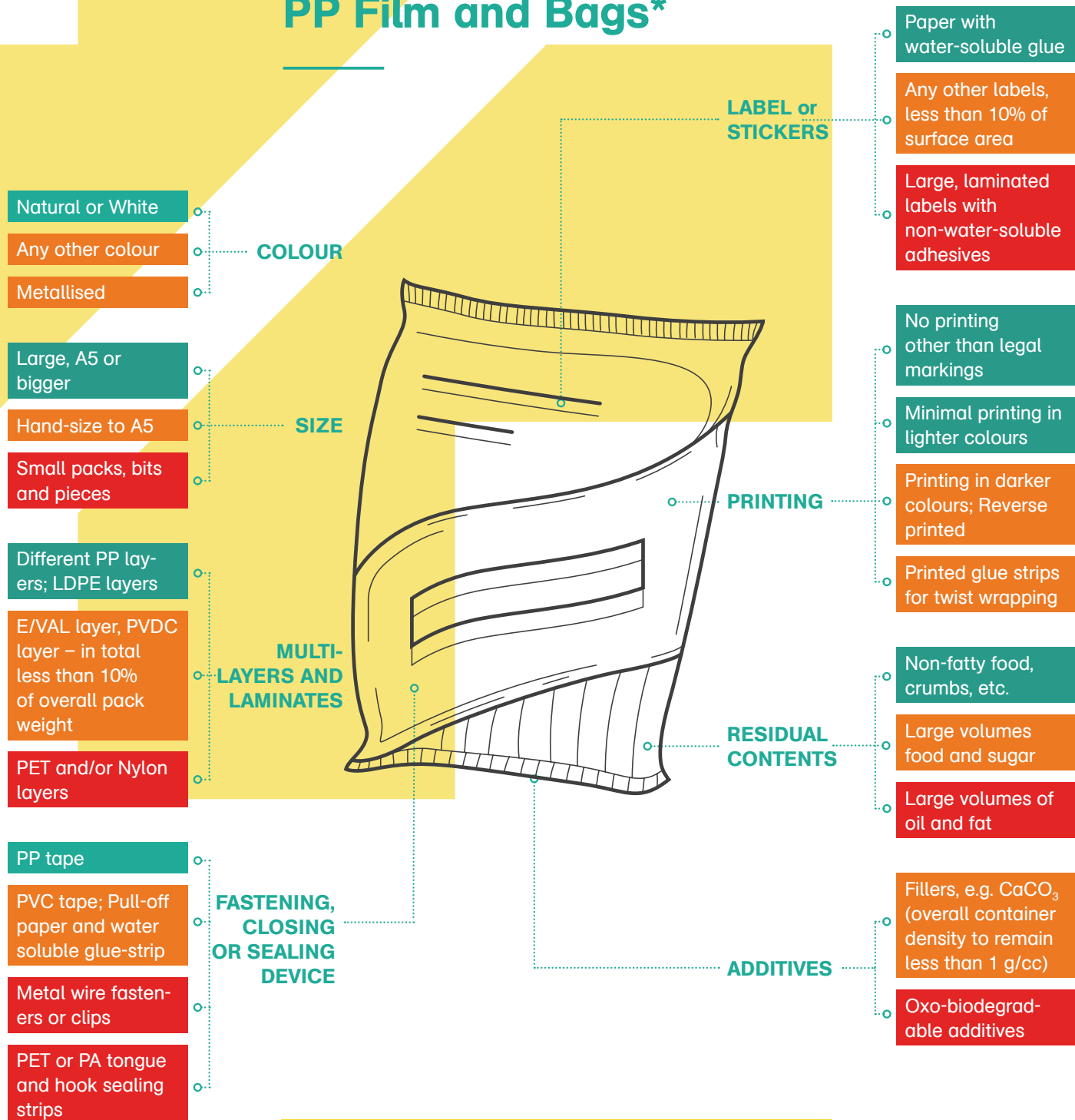
Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- ✦ Natural, clear films give a natural clear recyclate.
- ✦ Natural or light-coloured recyclate can be used for light-coloured or pigmented packaging products.
- ✦ Metallised and printed films result in dark green, dark grey or black recyclate.
- ✦ Dark green, dark grey or black recyclate can only be used for black products.
- ✦ Large, sticky labels are difficult to remove and the films would most likely not be collected or recycled.
- ✦ The colour and the strength of the polymer deteriorate with every recycling cycle.
- ✦ Limited opportunity for recycled content in cast or orientated films due to manufacturing process requirements





PP Film and Bags*



KEY:

- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all PP films, single and multi-layer

4

PP Tapes, Bags and Sacks

(Woven and Non-woven)

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your PP tapes, bags and sacks are designed to be recycled.

Ideally:

- ✦ Polymer should be natural, white or cream colour.
- ✦ Mono material construction.
- ✦ Limited printing, and only in light colours.

Avoid:

- ✦ Metal fasteners.
- ✦ Nylon webbing or zips.

QUALITY CRITERIA

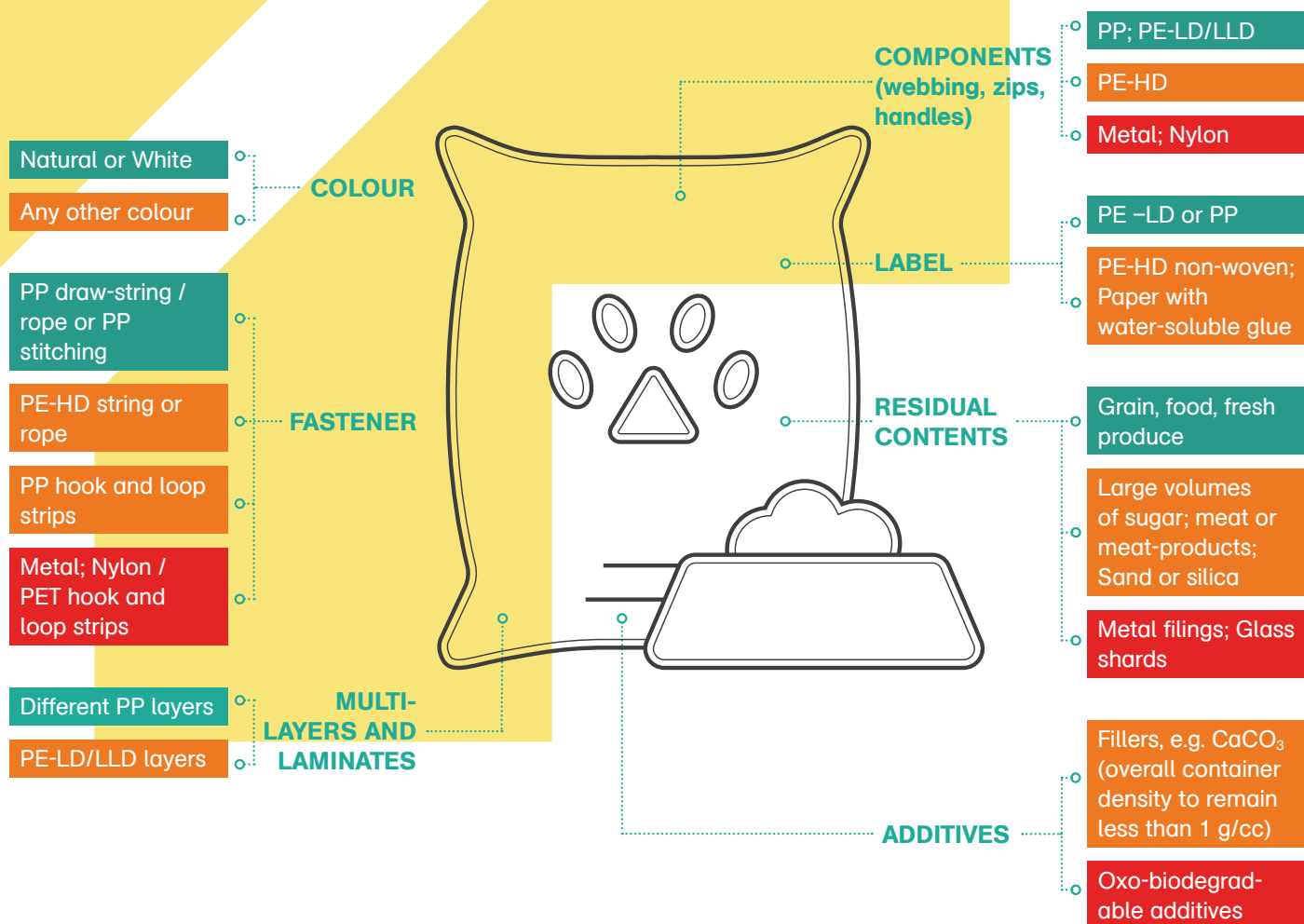
Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- ✦ Natural white or cream tapes give a light colour recyclate.
- ✦ Light-coloured recyclate can be used for light-coloured or pigmented packaging products.
- ✦ Heavily printed bags result in black recyclate.
- ✦ Black recyclate can only be used for black products.
- ✦ Residual content can be problematic if it contains broken glass or metal filings or excessive sand or cement.
- ✦ The colour and the strength of the polymer deteriorate with every recycling cycle.
- ✦ Limited opportunity for recycled content in cast or orientated films due to manufacturing process requirements.
- ✦ Non-woven bags can be recycled with woven bags.





PP Tapes, Bags and Sacks*



KEY:

- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all PP tapes, bags and sacks

5

PP Trays

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your PP trays are designed to be recycled.

Ideally:

- ✦ Polymer should be natural or white.
- ✦ Mono material should be used.
- ✦ Clearly marked with large and legible material identification code.

Avoid:

- ✦ Large, sticky labels.
- ✦ Multi-layer or laminated trays.
- ✦ Using the same mould for different materials without changing the material identification code

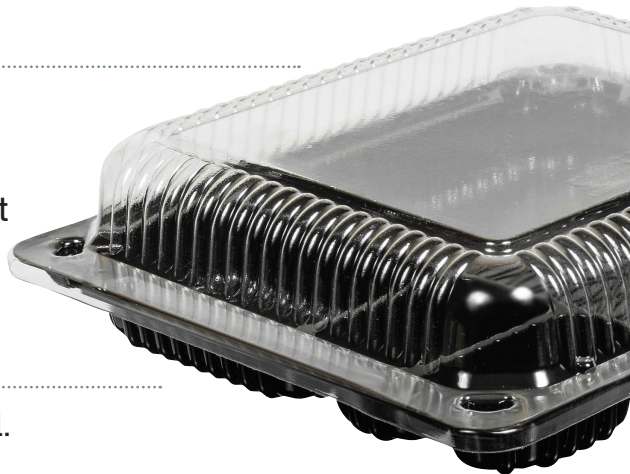
Notes:

- ✦ Easily confused with trays made from other material.

QUALITY CRITERIA

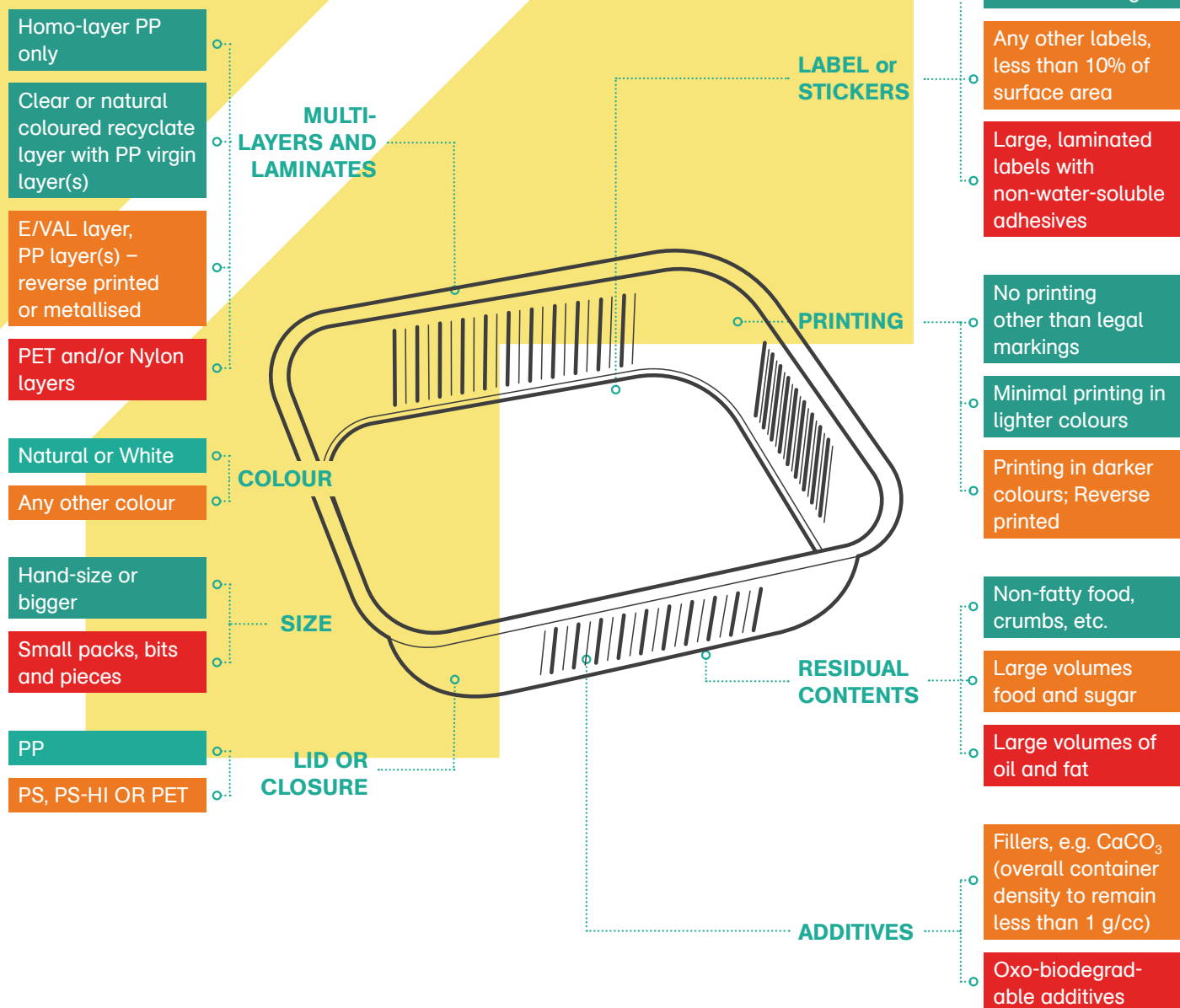
Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- ✦ Natural and white trays give a light colour recyclate.
- ✦ Light-coloured recyclate can be used for light-coloured or pigmented packaging products.
- ✦ Large, sticky labels are difficult to remove and the trays would most likely not be collected or recycled.
- ✦ Coloured and black trays will result in black recyclate.
- ✦ Black recyclate can only be used for black products.
- ✦ The colour and the strength of the polymer deteriorate with every recycling cycle.
- ✦ Multi-layer sheet extrusion facilities allow for recycled content in trays not directly in contact with food.





PP Trays and/or Lids*



KEY:

- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all PP trays, plates or punnets

6

PP Tubes

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your PP tubes are designed to be recycled.



Ideally:

- ✦ Mono material should be used.

Avoid:

- ✦ Big and heavy HDPE closures.

Notes:

- ✦ Large quantities of residual content discourages collection and recycling.
- ✦ Easily confused with tubes made from other material.
- ✦ Very small packaging items will only be “picked” up by waste collectors if part of a separation at source initiative, they are not desirable.
- ✦ Tottles follow same rules as bottles.

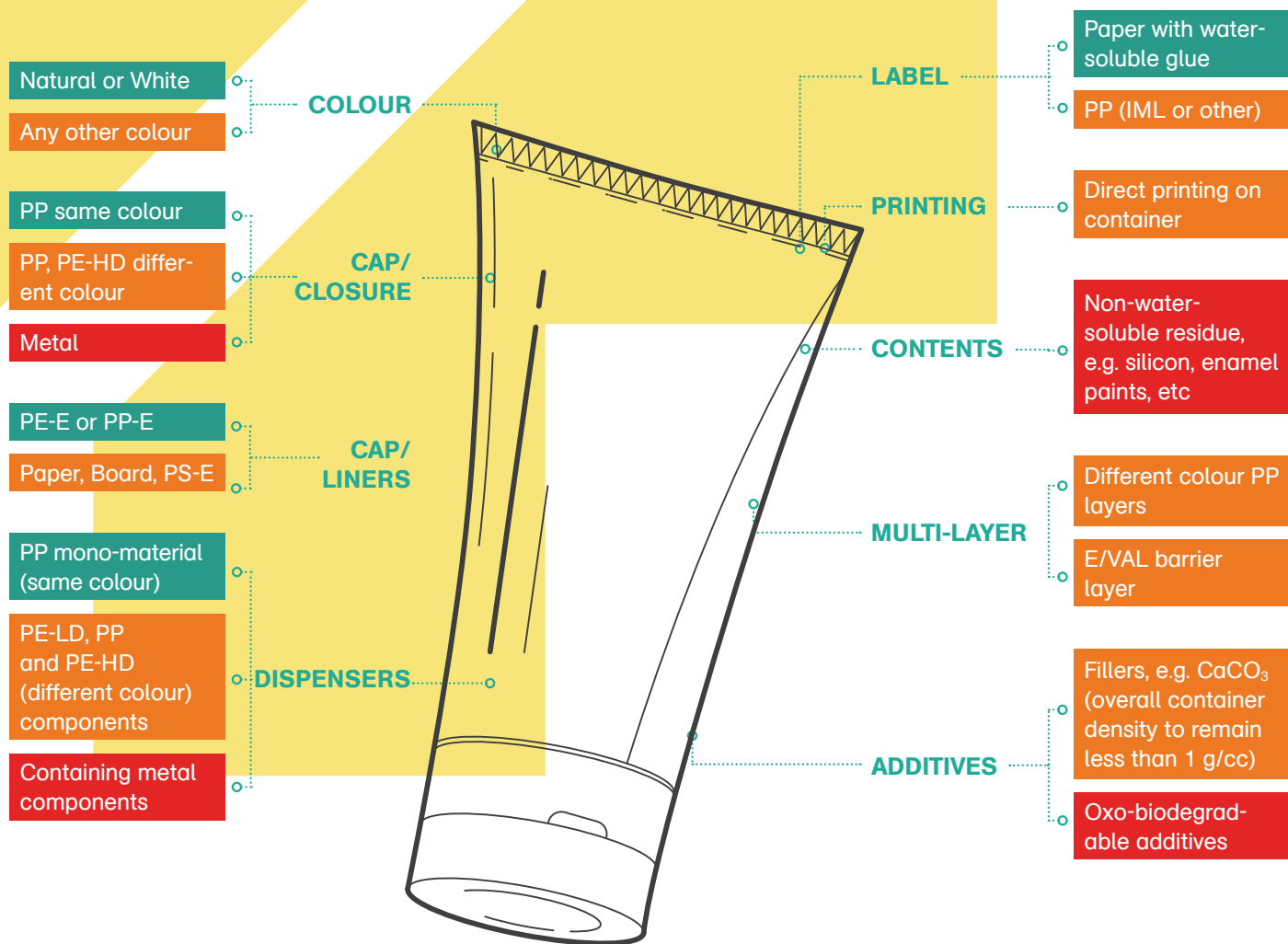
QUALITY CRITERIA

Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- ✦ Natural, white or cream coloured products give a light-coloured recyclate.
- ✦ Light-coloured recyclate can be used for light-coloured or pigmented packaging products.
- ✦ Printing cancels the light colour and results in dark grey or black recyclate.
- ✦ Dark recyclate can only be used for black products.
- ✦ The colour and the strength of the polymer deteriorate with every recycling cycle.
- ✦ Only extrusion grade to be used for tubes.
- ✦ Co-extrusion tube manufacturing can accommodate recycled content layers sandwiched between virgin layers.
- ✦ Ensure legible and correct material identification codes are used as PP tubes are easily confused with HDPE, LDPE or multi-layer tubes..



PP Tubes and Tottles*



KEY:

- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all PP tubes and tottles



Polyco (the Polyolefin Responsibility Organisation NPC) is focused on making waste a valuable resource that works for our economy. We aim to grow the collection and recycling of polyolefin plastic packaging in South Africa and to promote the responsible use and reuse of this plastic packaging. Our mission is to reduce the amount of plastic packaging going to landfill and to end plastic waste in the environment. Polyco does this by collaborating with multiple stakeholders, by investing in recycling innovation and infrastructure in South Africa, and by educating both the industry and the consumer about recycling.

We hope you have found these Design for Recycling Guidelines helpful. If you have any comments or queries please contact us.