The SUEZ.circpack®

DESIGN FOR RECYCLING GUIDELINES

for packaging

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suez

Design for Recycling

Packaging has multiple functions. A very important role is to **protect & preserve** the product during the product's lifecycle. The packaging is also used to **communicate** with the consumer and **provide** essential **information**.

Having performed its primary functions, **packaging inevitably becomes waste.**
The highest impact of packaging's **ecological footprint** comes from its **production** and the **used materials**. As these used **resources are limited**, it becomes more and more **important** to give these materials a **circular life**.

Sustainable plastic packaging will ultimately be circular: **containing recycled raw materials for production** AND **being fully recyclable**. In order to achieve this, the wasted materials will have to follow a **recycling route** which ensures high quality reuse of the materials.

Enabling the recycling of packaging does not start at the end of its life, but right at the beginning. The design phase is the most essential moment to take recycling into account.

These guidelines will assist you to ensure that the packaging you design can be recycled.
As technologies are evolving, this guideline is a living document, and will be updated regularly.

Let's give packaging a second life. Let's design for recycling!

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Content

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HOW WE CAN ASSIST

SUEZ is one of the world's biggest companies in the waste management sector. We have insights and hands-on experience in collection, sorting, reprocessing and recycling of packaging. On top of this we are also active in licensing & certification.

We love to share our knowledge to complete the circle, to give packaging a second life, to save our resources and to protect our planet.

We are ready for the Resource Revolution!

Our Vision

SUEZ.circpack® **is an internationally active consulting service of SUEZ, specialized in circular packaging and recyclability. Our main services are:**

- **Workshop & visit**: **DISCOVER** the world of recycling. Visit a sorting installation for household packaging and learn the essentials of recycling and design for recycling in a half day workshop.
- **Dedicated research**: make your question our challenge. From a basic operational sorting test up to dedicated lab-research or desk studies, all types of research are part of our **EXPLORE** service
- **Help in packaging design**: Let's **CO-CREATE** new packaging. With our combination of theoretical and operational knowledge we support you in the design of new packaging in order to ensure its recyclability.

CERTIFY: certification of recyclability

On top of the services above, we offer **CERTIFY**. Based on a clear methodology, the recycling percentage of a packaging will be assessed and officially certified. This certification can serve as a mean to prove the recyclability of a packaging towards EPR systems and can be used in communication with consumers.
SUEZ.circpack® is proud to be an accredited certifying body of RecyClass for plastic based packaging. This partnership lead to co-development of the guidelines, test protocols, scoring mechanism and the certification protocol.

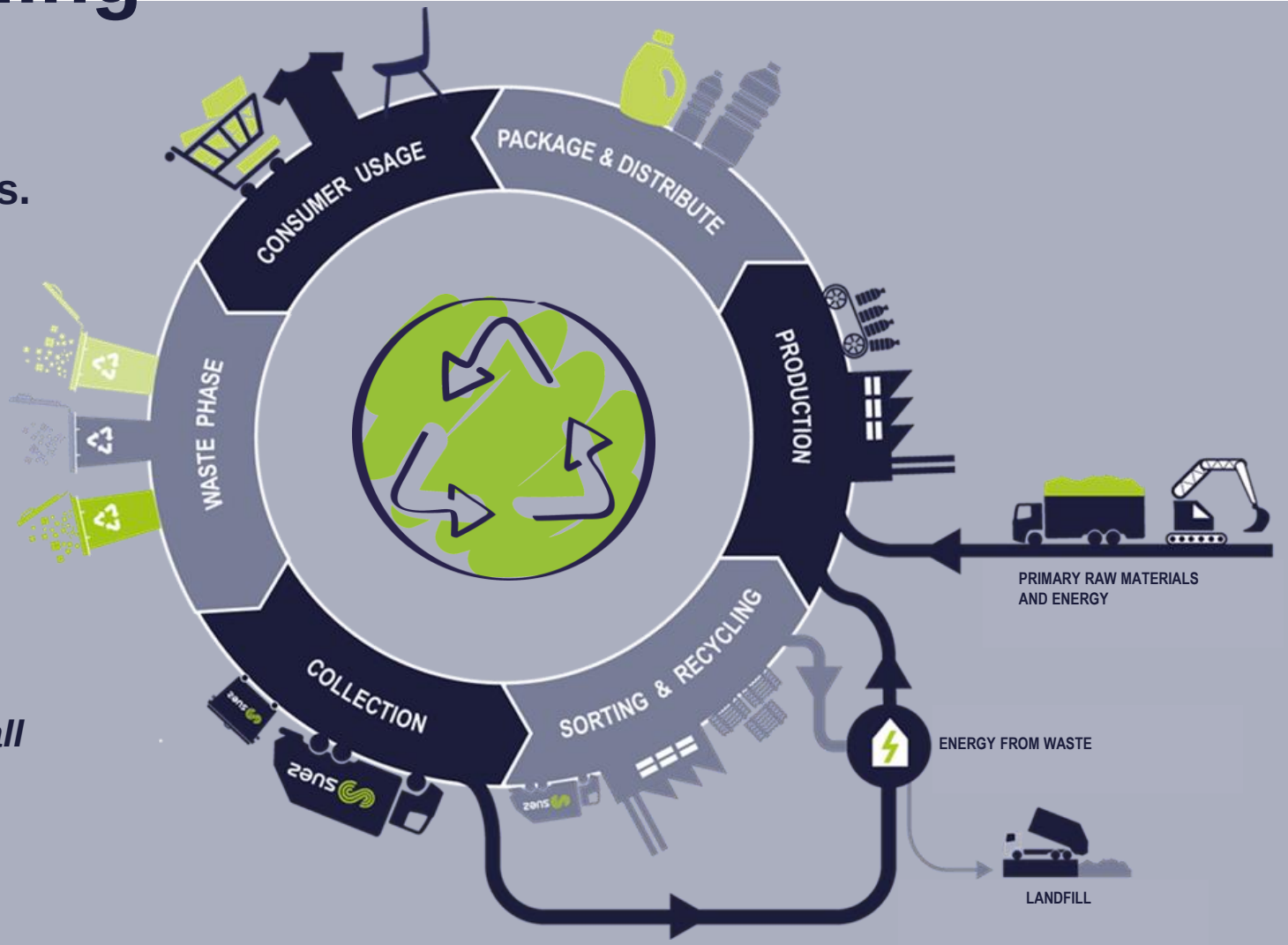
Essential steps in recycling

We believe that recyclability only exists when it is part of our day-to-day operations.

So, before we consider a packaging to be ‘recyclable’, four ESSENTIAL STEPS IN RECYCLING have to be met:

1. **Collection**
2. **Sorting**
3. **Reprocessing**
4. **Application**

Only if a packaging (or it materials) can follow all these steps, we consider it to be recyclable.



Steps in recycling

1 COLLECTION

- In most Western- European countries, household packaging is collected separately from paper-, residual- and organic-waste.

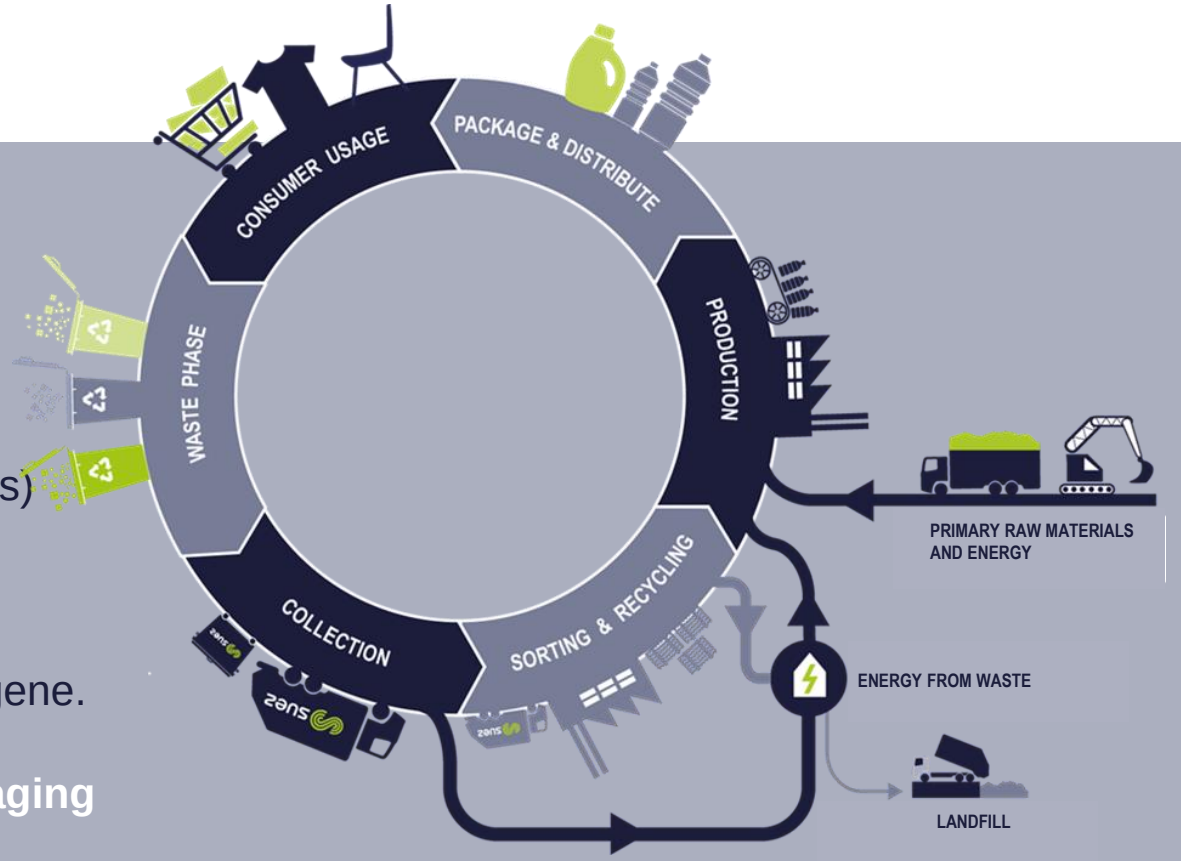
- For the collection of special waste streams (soda bottles, batteries) local deposit systems can be in place. Consumers can return the used product or packaging for recycling.

- The collection of Business to Business waste is often less homogene.

! **Inform the consumer WHERE and HOW to dispose the packaging**

- The better the packaging can get emptied the better the recycling can be.

! **Optimise the shape of the packaging for easy emptying**



Steps in recycling

2 SORTING

- One of the first steps in the sorting process of **household packaging waste** is, to sort the material by size.

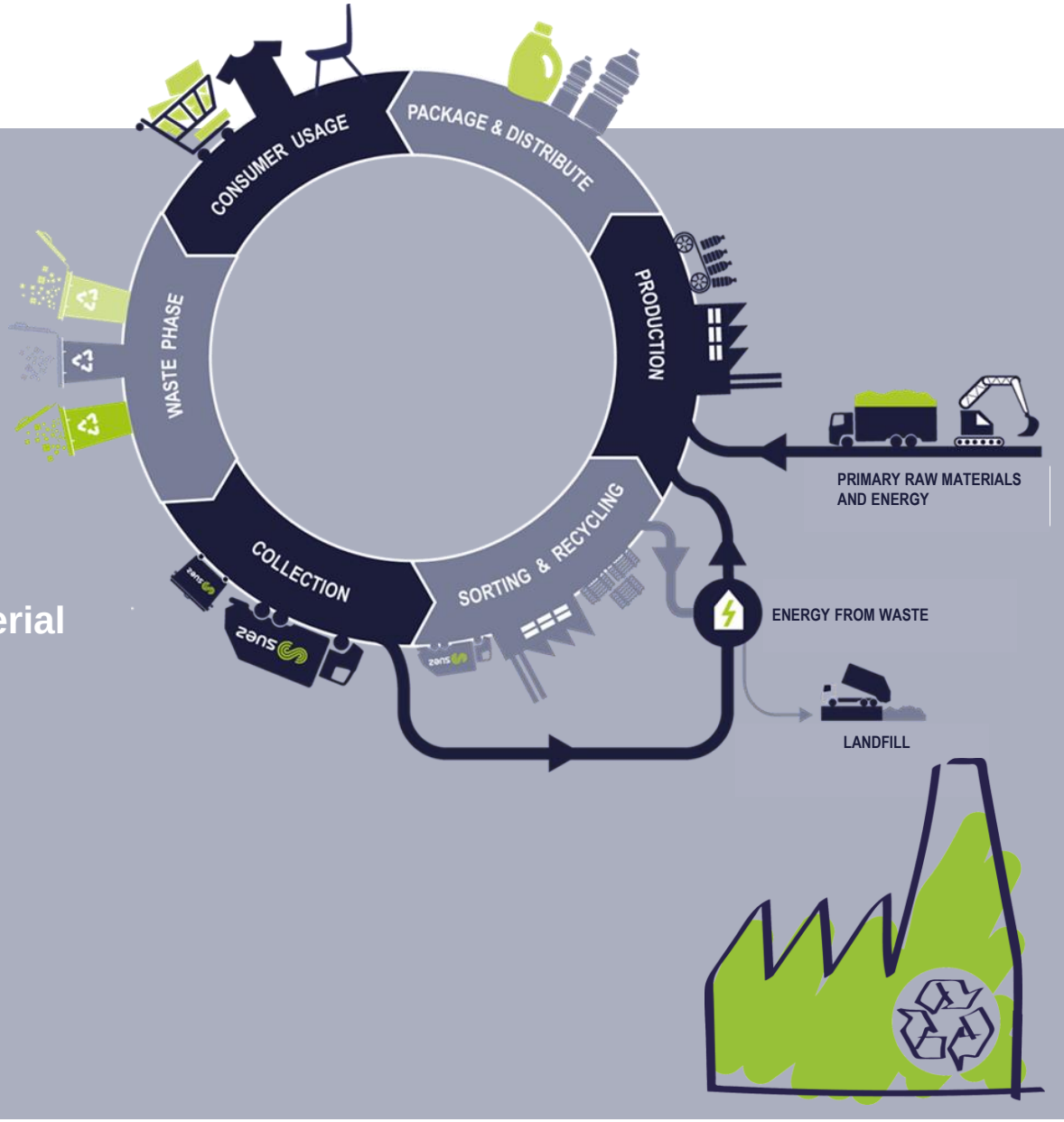
! **Small items (<2 cm) will not be recycled**

- Infra-red scanners **detect** the used type of material.

! **Make sure that the scanners can identify the main used material**

- The most **common materials** that are sorted, are *PP, PE, PET, Aluminium, Tin* and *Beverage cardboards.*

! **Please use the commonly sorted & recycled materials**



Steps in recycling

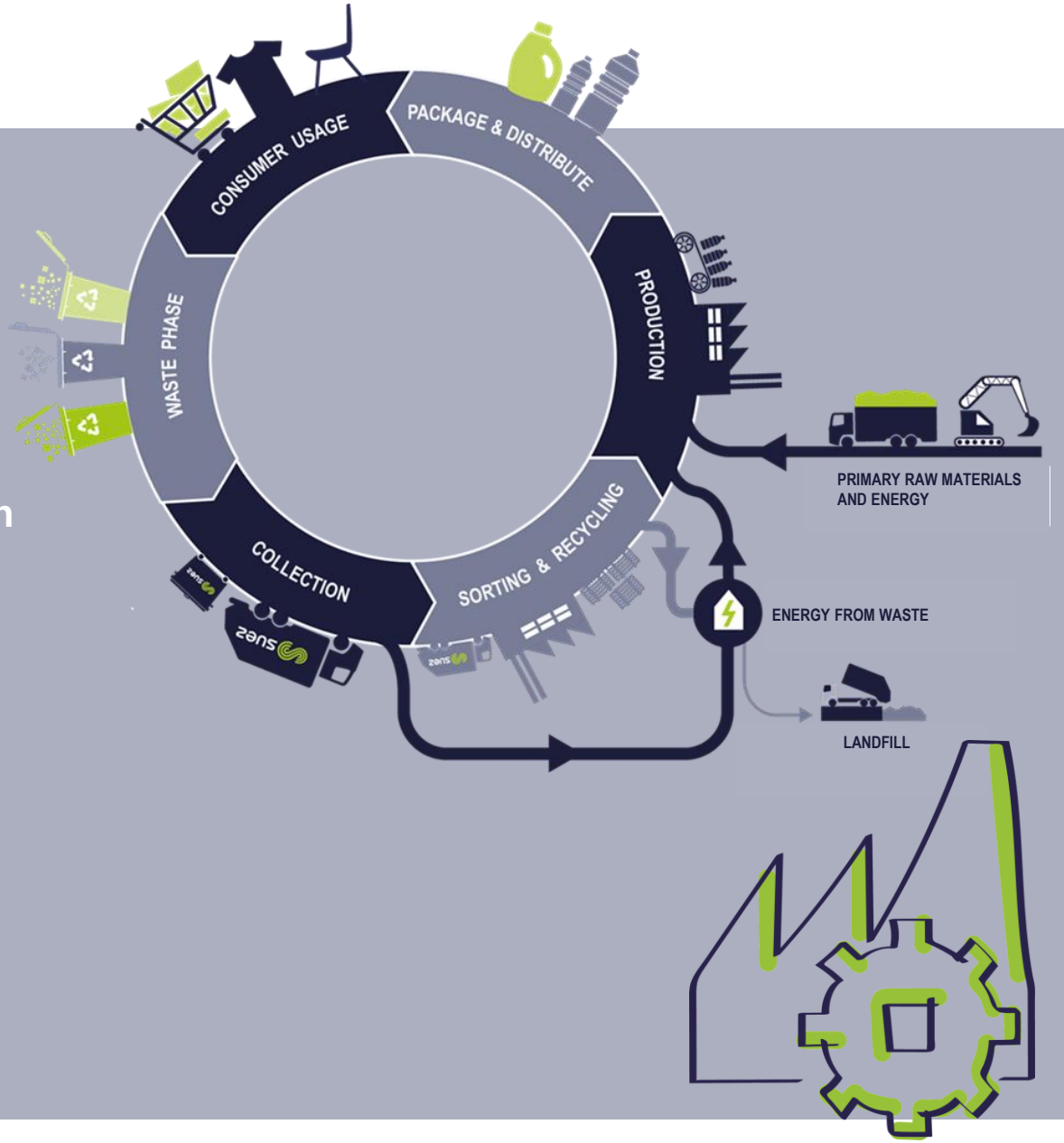
3 RECYCLING

At the plastic recycler the material gets shredded and washed.
! Make sure that labels and glues can be washed off.

The packaging will now pass through a sink-float-tank to separate types of plastics based on their different densities.
! Make sure that you do not use different kind of materials with alike density to prevent contamination

There are substances which are hazardous for the recycling because they contaminate the plastics and can obstruct recycling process (e.g. silicone)
! Do not use material which will obstruct the reprocessing

For the reusability of plastics it's important to limit colourisation.
! Use transparent and light coloured plastics



Steps in recycling

ADDITIONAL DESIGN QUESTIONS

Which requirements does the packaging have to meet:

- ✓ Are all these requirements still essential?
- ✓ Can these requirements be rethought?

Which different packaging can meet these requirements:

- ✓ Is it possible to replace a mixture of materials with mono-material?
- ✓ Can you use a lighter colour or transparent packaging?
- ✓ Is it possible to change the shape of the packaging to make it more easy to empty?
- ✓ Do you really need such a long shelf life?

Search for optimization potential:

- ✓ Can we use a label made from the same material as the packaging?
- ✓ Can the label be smaller?
- ✓ How can we make sure, that all materials will get separated (in households or at the latest during the sorting process)?

Questions to answer...

DESIGN FOR RECYCLING GUIDELINES

DESIGN GUIDELINES

On the following pages you will find an overview of different types of materials used in packaging.
For each material, we provide you with details on:

1. **Fully compatible** materials, which can be **fully recycled**,
2. **Limited compatible** materials, which can **not be recycled**, but will not hinder the recycling of recyclable materials in the packaging
3. **Low or non-compatible** materials, that can **not be recycled** & will **also obstruct** the recycling of the recyclable materials in the packaging

DESIGN GUIDELINES

PET bottles

BOTTLE BODY:
- transparent or clear, not printed
- PET monomaterial

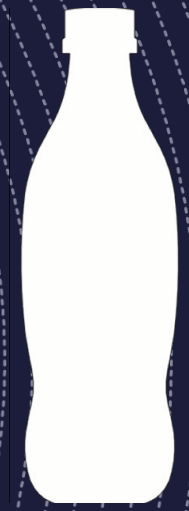
CAP:
- use PE or PP (density < 1g/cm³)

SLEEVE:
- Density < 1g/cm³ → PE or PP
- smaller than 50% of the surface

DESIGN GUIDELINES

PET Bottles

Transparent Clear and light-blue

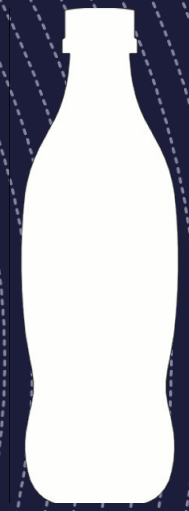


	Yes! ☺ Full compatibility for reprocessing	Conditional 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material Bottle**	PET		PLA; PVC; PS; PETG
Size			< 4 cm (compacted); > 5 liter content
Colours	Transparent clear, transparent light colours		Opaque; Other transparent colours;Fluorescence; Metallic.
Barrier	SiOx plasma coating.	Carbon plasma-coating; PA-MXD6 multilayer with <5wt% PA-MXD6 and no tie layers; PGA multilayer; PTN alloy	PA multilayer with >5wt% PA or tie layers; Monolayer PA blend; EVOH.
Additives		UV stablilisers; Acetaldehyde (AA) blockers; Optical brighteners; Oxygen scavengers	Bio-/oxo-/photodegradable additives; Nanocomposites
Closure Systems	PE (with density <1 g/cm³); PP (with density <1 g/cm³);		Materials and blends with density >1 g/cm³ (e.g. highly filled PE, metals,…); Non-detaching or welded closures.
Liners, Seals and Valves	PE; PE + EVA; PP; foamed PET (all with a density < 1 g/cm³)	Silicone with density <0.95g/cm³	Materials with density >1 g/cm³ (e.g. PVC, silicone, metals)
Labels	Labels in PE; PP; OPP; EPS; foamed PET (all with density <1 g/cm³), with a size that does not hinder* the recognition of the underlaying PET-polymer ** indication label size of bottles > 500 ml: < 70% coverage* ** indication label size of bottles ≤ 500 ml: < 50% coverage*	Lightly metallized labels; Paper labels without fiberlosses	Labels which hinder the recognition of the underlaying PET-polymer (e.g. too large, metalised, heavily inked); Labels with density >1 g/cm³ (e.g.PVC; PS; PET; PETG; PLA); Non-detaching or welded labels; Paper labels with fibreloss Foamed PETG labels (even with density <1 g/cm³); PET labels with washable inks
Sleeves	Sleeves in PE; PP; OPP; EPS; foamed PET; LDPET (all with density <1 g/cm³), with a size that does not hinder* the recognition of the underlaying PET-polymer ** Indication sleevesize of bottles > 500 ml: < 70% coverage* ** Indication sleevesize of bottles ≤ 500 ml: < 50% coverage*	Full sleeves translucent for IR detection in PE; PP; OPP; EPS; foamed PET; LDPET; all with density <1 g/cm³ INTERIM: Twin-peforated sleeves for household and personal care conform guidelines by EPBP	Sleeves which hinder the recognition of the underlaying PET-polymer (e.g. too large, metalised, heavily inked); Sleeves with density >1 g/cm³ (e.g.PVC; PS; PET; PETG); Foamed PETG sleeves (even with density <1 g/cm³); PET sleeves with washable inks
Tamper Evidence Wrap	PE; PP; OPP; EPS, Foamed PET (all with density <1 g/cm³)	EPS, Foamed PET or foamed PETG (with density <1 g/cm³)	Materials with density >1 g/cm³ (e.g metal; PVC; PS; PET, PETG); Metallised materials.
Adhesives for labels	Alkali/water soluble and alkali/water releasable adhesive at 60-80°C without reactivation	Hot-melts; Pressure-sensitive labels.	Non-soluble in water or alkaline at 60-80°C; Non-releasable in water or alkaline at 60-80°C; Adhesives non-soluble in water or alkaline at 60-80°C
Inks	Non-toxic (according to EUPIA guidelines)		Inks that bleed; Toxic or hazardous inks; Metallic inks
Direct Printing	Laser marked print;	Printed production or expiry date	Any other direct printing
Other Components	Base cup, handles or other components which are separated by grinding and float/sink - all with density <1 g/cm³; Unpigmented PET		Materials with density >1 g/cm³ (e.g. metal, RFID tags); Non detaching or welded components; Coloured PET

** Polymer resin can be either fossil- or bio-based.

DESIGN GUIDELINES

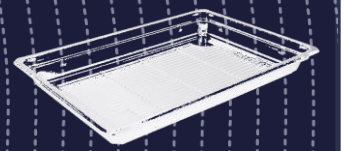
PET Bottles
Transparent Coloured



	Yes! ☺ Full compatibility for reprocessing	Conditional 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material Bottle**	PET		PLA; PVC; PS; PETG
Size			< 4 cm (compacted); > 5 liter content
Colours	Transparent light colours	Transparent dark colours	Opaque; Fluorescence; Metallic.
Barrier	SiOx coating; Carbon plasma-coating; PA-MXD6 multilayer with <6wt% PA-MXD6 and no tie layers; PTN alloy	EVOH multilayer with <3 wt% EVOH and no tie layers; PA-MXD6 multilayer with <6wt% PA-MXD6 including tie layers; Monolayer PA-MXD6 blend; PGA multilayer	EVOH multilayer with >3wt% EVOH or with tie layers. PA-MXD6 multilayer with >6wt% PA-MXD6
Additives		UV stablilisers; Acetaldehyde (AA) blockers; Optical brighteners; Oxygen scavengers;	Bio-/oxo-/photodegradable additives; Nanocomposites.
Closure Systems	PE (with density <1 g/cm³); PP (with density <1 g/cm³);		Materials and blends with density >1 g/cm³ (e.g. highly filled PE, metals,...); Non-detaching or welded closures.
Liners, Seals and Valves	PE; PE + EVA; PP; foamed PET (all with a density < 1 g/cm³)	Silicone with density <0.95g/cm³	Materials with density >1 g/cm³ (e.g. PVC, silicone, metals)
Labels	Labels in PE; PP; OPP; EPS; foamed PET (all with density <1 g/cm³), with a size that does not hinder* the recognition of the underlaying PET-polymer * Indication labelsize of bottles > 500 ml: < 70% coverage * Indication labelsize of bottles ≤ 500 ml: < 50% coverage	Lightly metallized labels; Paper labels without fiberlosses	Labels which hinder the recognition of the underlaying PET-polymer (e.g. too large, metalised, heavily inked); Labels with density >1 g/cm³ (e.g.PVC; PS; PET; PETG; PLA); Metallized labels; Nondetaching or welded labels; Paper labels with fibreloss; Foamed PETG labels (even with density <1 g/cm³); PET labels with washable inks
Sleeves	Sleeves in PE; PP; OPP; EPS; foamed PET; LDPET (all with density <1 g/cm³), with a size that does not hinder* the recognition of the underlaying PET-polymer * Indication sleevesize of bottles > 500 ml: < 70% coverage * Indication sleevesize of bottles ≤ 500 ml: < 50% coverage	Full sleeves translucent for IR detection in PE; PP; OPP; EPS; foamed PET; LDPET; all with density <1 g/cm³ INTERIM: Twin-peforated sleeves for household personal care conform guidelines by EPBP	Sleeves which hinder the recognition of the underlaying PET-polymer (e.g. too large, metalised, heavily inked); Sleeves with density >1 g/cm³ (e.g.PVC; PS; PET; PETG); Foamed PETG sleeves (even with density <1 g/cm³); PET sleeves with washable inks
Tamper Evidence Wrap	PE; PP; OPP; EPS, Foamed PET (all with density <1 g/cm³)		Materials with density >1 g/cm³ (e.g metal; PVC; PS; PETG); Metallised materials; Foamed PETG (even with density <1 g/cm³); PET with washable inks
Adhesives for labels	Alkali/water soluble and alkali/water releasable adhesives at 60-80°C without reactivation Water or alkali soluble and/or water-releasable in 60-80 °C	Hot-melts; Pressure-sensitive labels.	Non-soluble in water or alkaline at 60-80°C; Non-releasable in water or alkaline at 60-80°C Non-soluble adhesives (or non-water-releasable) in water or alkaline at 60-80°C
Inks	Non-toxic (according to EUPIA guidelines)		Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked print;	Printed production or expiry date	Any other direct printing
Other Components	Base cup, handles or other components which are separated by grinding and float/sink - all with density <1 g/cm³; PET		Materials with density >1 g/cm³ (e.g. metal, RFID tags); Non-detaching or welded components;

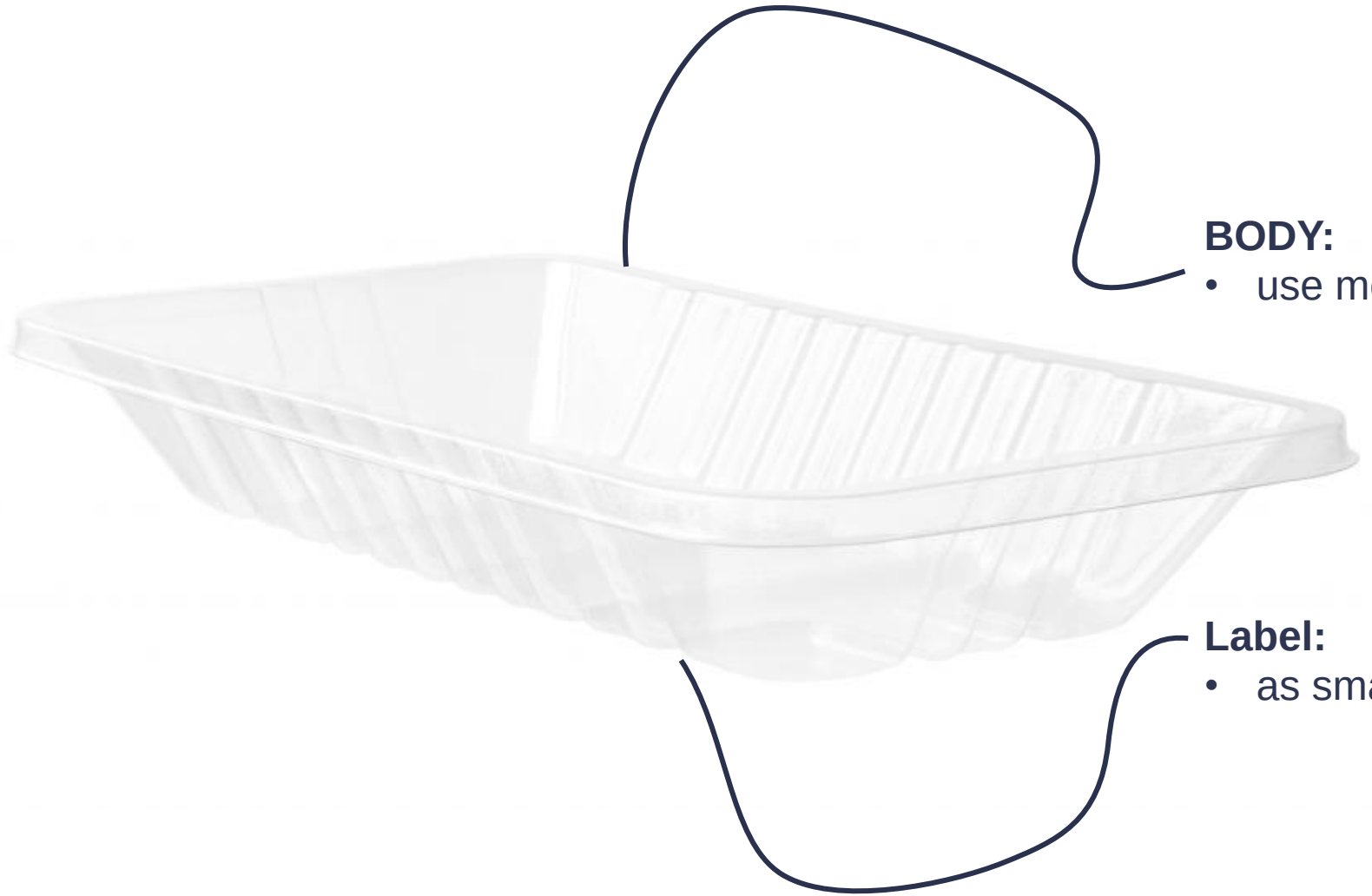
** Polymer resin can be either fossil- or bio-based.

DESIGN GUIDELINES



PET trays

Transparent clear



BODY:

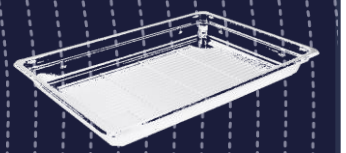
- use monolayer material

Label:

- as small as possible

DESIGN GUIDELINES

PET trays Transparent Clear



	Yes! ☺ Full compatibility for reprocessing	Conditional 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Tray**	PET		Any PET based multilayer material including PET/PE; PLA; PVC; PS; PETG; C-PET; PET-GAG; Expanded PET
Colours	Transparent clear; Transparent light blue.		Opaque; Other transparent colours; Metallic; Opaque;
Size		Items compacted < 5 cm	Items compacted < than 2 cm
Barrier	PET based oxygen scavenger without yellowing effect after EPBP oven test.	PET based oxygen scavenger with limited yellowing effect after EPBP oven test.	EVOH; PA; any other barrier; any other oxygen scavenger.
Additives	Silicone surface coating (on coating area); Antiblocking masterbatch (max 3%).	UV stablilisers; AA blockers; optical brighteners; antiblocking masterbatch (> 3%); anti-stat agents; antiblocking agents; anti-fogging agents (on coating area)	Bio/Oxo/Photodegradable additives; Nanocomposites
Closure Systems: Lidding films	Unprinted PET; Floating plastics with density < 1 g/cm³ and easily removal from the tray and without glue residuals; foamed PET based films where foamed structure is not getting destroyed @90°C; SiOx and AluOx plasma for barrier		Any other film
Labels	Labels in PE; PP; OPP (all with density <1 g/cm³ and also in the more heavily printing area), with a size that does not hinder* the recognition of the underlaying PET-polymer ** Indication label size of trays: < 30% coverage*	BPA-free paper labels without fibreloss during recycling process	Plastic labels with density > 1 g/cm³ (also in more heavily printed and glued area's); Paper labels with fibreloss during recycling process; Paper labels containing BPA.
Label Adhesives	100% removable adhesives leaving no adhesive residuals on flakes at 70°C.	100% removable adhesives leaving no adhesive residuals on flakes at 85°C.	All other adhesives
Adhesives on other parts than lidding film and labels	Alkali/water soluble and alkali/water releasable adhesives at 60-80°C without reactivation Water or alkali soluble at 60-80°C		Any other adhesive
Inks	Non toxic following the EuPIA Guidlines		Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked;	Production or best-before date.	Any other direct printing
Other Components	Inserts in HDPE / LDPE / PP like Soaker pads, bubble pads (all inserts should be completely removable, leave no traces and have a density of <1,0 g/cm³)	Paper & cardboard not loosing fibres	PVC / PS / EPS / PU / PA; Thermoset plastics; Metals; Paper & cardboard loosing fibres.

** Polymer resin can be either fossil- or bio-based.

DESIGN GUIDELINES

PP rigids

BODY:
- use PP monomaterial

CAP:
- use PE or PP (density < 1g/cm³)

ADDITIVES:
- don‘t use density changing additives

DESIGN GUIDELINES

PP rigids Natural

	Yes! ☺ Full compatibility for reprocessing	Not conflicting 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material**	PP		Multilayers PP with PLA; PVC; PS; PET; PETG
Size		Items compacted < 5 cm	Items compacted < than 2 cm;
Colours	Natural (clear)	Light colours	Black Inner layer; Black; Carbon Black; Other dark colours
Barrier			EVOH**; PA; PVDC; Aluminium
Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants, nucleating agents, peroxides) and density remains <0.97 g/cm³	Mineral fillers (CaCO3, talc) not increasing density more than 0,97 g/cm³	Additives changing the material density > 1 g/cm³ Flame-retardant additives, plasticizers Bio-/oxo-/photodegradable additive
Closure Systems	PP	HDPE; LDPE; LLDPE; MDPE; PET; PETG; PS; PLA (all with a density >1g/cm3).	Non-PO and/or foams with density <1g/cm^3; Aluminium; Metal; PVC
Liners, Seals and Valves	PP; TPE-PP	HDPE; LDPE; LLDPE; MDPE; PET, PETG, PS, PLA (all with a density >1g/cm3); Removable aluminium fasteners Removable silicon with a density > 1 g/cm³	Non-PO and/or foams with density <1g/cm^3; Any other TPE Aluminium; Metal; Foiled paper; PVC
Labels	Labels in PP (all with density <1 g/cm³)* * with a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer	Labels in PE (with density <1 g/cm³)*; Labels in PET, PETG, PS, PLA (all with density >1 g/cm³)*; Labels in Paper and without fibreloss during the recycling process*; PO-foamed labels* ** with a size, a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer:* *- Indication label size on containers > 500 ml: < 70% coverage* *- Indication label size on containers ≤ 500 ml: < 50% coverage*	Labels that hinder the recognition of the PP; Labels in non PO-materials with density < 1 g/cm³ ; Paper labels with fibreloss during recycling process; Aluminium; Metalised labels; PVC
Sleeves	Sleeves in PP (with density <1 g/cm³)* * with a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer	Sleeves in PP (with density <1 g/cm³)* Sleeves in PET, PETG, PS, PLA (all with density >1 g/cm³)* ** with a size, a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer:* *- Indication sleeve size on containers > 500 ml: < 70% coverage* *- Indication sleeve size on containers ≤ 500 ml: < 50% coverage*	Sleeves that hinder the recognition of the PP; Sleeves in non PO-materials with density <1 g/cm3 ; Aluminium; Metalised Sleeves; Heavily inked sleeves; PVC
Adhesives for labels	Water soluble or water releasable adhesive (@ less than	Pressure sensitive labels	Non water soluble or water releasable adhesives;
Inks	Non toxic following the EuPIA Guidlines		Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked; Production or best-before date		Any other direct printing
Other Components	PP	PE with density <1 g/cm³; PET; PETG; PS; PLA all with density >1 g/cm³	Aluminium; PVC; Glass components; Non-PO and /or foams with density < 1 g/cm^3

** Polymer resin can be either fossil- or bio-based.
*** Under investiagtion by the RecyClass PP Technical Commitee.

DESIGN GUIDELINES

PP rigids Coloured

	Yes! ☺ Full compatibility for reprocessing	Not conflicting 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material**	PP		Multilayers PP with PLA; PVC; PS; PET; PETG
Size		Items compacted < 5 cm	Items compacted < than 2 cm;
Colours	All colours	Black inner layer and dark colours (NIR-detectable)	Non NIR detectable colours
Barrier		EVOH ≤ 1%***	EVOH > 1%***; PA; PVDC; Aluminium
Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants, nucleating agents, peroxides) and density remains <0,97 g/cm³	Mineral fillers (CaCO3, talc) not increasing density more than 0,97 g/cm³	Additives changing the material density > 1 g/cm³ Flame-retardant additives, plasticizers Bio-/oxo-/photodegradable additives
Closure Systems	PP	- HDPE; LDPE; LLDPE; MDPE; - PET; PETG; PS; PLA (all with a density >1g/cm3).	Non-PO and/or foams with density <1g/cm^3; Aluminium; Metal; PVC
Liners, Seals and Valves	PP; TPE-PP	HDPE; LDPE; LLDPE; MDPE; PET, PETG, PS, PLA (all with a density >1g/cm3); Removable aluminium fasteners Removable silicon with a density > 1 g/cm³	Non-PO and/or foams with density <1g/cm^3; Any other TPE Aluminium; Metal; Foiled paper; PVC
Labels	Labels in PP (all with density <1 g/cm³)* * with a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer	Labels in PE (with density <1 g/cm³)*; Labels in PET, PETG, PS, PLA (all with density >1 g/cm³)*; Labels in Paper and without fibreloss during the recycling process*; PO-foamed labels* ** with a size, a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer:* *- Indication label size on containers > 500 ml: < 70% coverage* *- Indication label size on containers ≤ 500 ml: < 50% coverage*	Labels that hinder the recognition of the PP; Labels in non PO-materials with density < 1 g/cm³ ; Paper labels with fibreloss during recycling process; Aluminium; Metalised labels; PVC
Sleeves	Sleeves in PP (with density <1 g/cm³)* * with a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer	Sleeves in PP (with density <1 g/cm³)* Sleeves in PET, PETG, PS, PLA (all with density >1 g/cm³)* ** with a size, a print and/or barrier that does not hinder the recognition of the underlaying PP-polymer:* *- Indication sleeve size on containers > 500 ml: < 70% coverage* *- Indication sleeve size on containers ≤ 500 ml: < 50% coverage*	Sleeves that hinder the recognition of the PP; Sleeves in non PO-materials with density <1 g/cm3 ; Aluminium; Metalised Sleeves; Heavily inked sleeves; PVC
Adhesives for labels	Water soluble or water releasable adhesive (@ less than 40°C)	Pressure sensitive labels	Non water soluble or water releasable adhesives;
Inks	Non toxic following the EuPIA Guidlines		Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked; Production or best-before date	Any other direct printing	
Other Components	PP	PE with density <1 g/cm³; PET; PETG; PS; PLA all with density >1 g/cm³	Aluminium; PVC; Glass components; Non-PO and /or foams with density < 1 g/cm^3

** Polymer resin can be either fossil- or bio-based.
*** Under investiagtion by the RecyClass PP Technical Commitee.

DESIGN GUIDELINES

PP flexibles

BODY:

- use light and transparent colours
- don‘t use inks

DESIGN GUIDELINES

PP flexibles Natural

	Yes! ☺ Full compatibility for reprocessing	Conditional 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material	PP	Multilayer PE/PP	Any other polymer (ex. PET, PVC, etc.)
Colours	unpigmented; transparent	light colours; translucent colours	Dark colours; black; carbon black
Size	> A4 or > 50 x 50 mm once compacted	< A4 format or between 20 x 20 and 50 x 50 mm once compacted (Sorting test)	< 20 x 20 mm
Barrier	Barrier in the polymer matrix; SiOx and AlOx without additional coatings	EVOH (in polyolefinc combination film); metalized layers without coatings	Barrier layer PVC, PVDC, PA; any other barrier layer; foaming agents used as expandant chemical agents; aluminium
Additives	Additives that do not increase the density higher than 0,97 g/cm³		Bio-/oxo-/photodegradable additives Additives that do increase the density higher than 0,97 g/cm3 (CaCO3, talc, glass fibers, etc.)
Closure Systems	PP	PE	Metal, aluminium, PVC,PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm^3
Liners, Seals and Valves	PP	PE, removable aluminium fasteners	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm^3
Labels	PP	PE, paper labels without fiberloss	Metallized labels, any other; paper labels with fibreloss
Adhesives	Water soluble or water-releasable at less than 60°C		Adhesives non-soluble in water or non-releasable in water at less than 60°C
Inks	No inks	Non-toxic (according to EUPIA guidelines)	Inks that bleed; Toxic or hazardous inks
Direct Printing	Laser marked print; Printed production or expiry date	Printing covering < 50%**	Printing covering > 50%**
Other Attachments	PP	PE	Metal, aluminium, PVC, PET, PETG, PS, PLA, paper, foams with density < 1 g/cm

**temporary solution

DESIGN GUIDELINES

PP flexibles Coloured

	Full compatibility for reprocessing	Limited compatibility for reprocessing	Low (or no) compatibility for reprocsssing
Main Material	PP	Multilayer PE/PP	Any other polymer (ex. PET, PVC, etc.)
Colours	Light colours; translucent colours	Dark colours (NIR detectable)	Non-NIR detectable colours
Size	> A4 or > 50 x 50 mm once compacted	< A4 format or between 20 x 20 and 50 x 50 mm once compacted (Sorting test)	< 20 x 20 mm
Barrier	Barrier in the polymer matrix; SiOx and AlOx without additional coatings	EVOH (in polyolefinc combination film); metalized layers without coating	Barrier layer PVC, PVDC, PA; any other barrier layer; foaming agents used as expandant chemical agents; aluminium
Additives	Additives that do not increase the density higher than 0,97 g/cm³	NIR-detectable dark colours (Sorting test)	Bio-/oxo-/photodegradable additives; additives concentration > 0,97 g/cm^3
Closure Systems	PP	PE	Metal, aluminium, PVC,PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm^3
Liners, Seals and Valves	PP	PE, removable aluminium fasteners	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm^3
Labels	PP	PE, paper labels without fiberloss	Metallized labels, any other; paper labels with fibreloss
Adhesives	Water soluble or water-releasable at less than 60°C		Adhesives non-soluble in water or non-releasable in water at less than 60°C
Inks	No inks	Non-toxic (according to EUPIA guidelines)	Inks that bleed; Toxic or hazardous inks
Direct Printing	Laser marked print; Printed production or expiry date; printing covering < 50%**	Printing covering > 50%**	
Other Attachments	PP	PE	Metal, aluminium, PVC, PET, PETG, PS, PLA, paper, foams with density < 1 g/cm3

**temporary solution

DESIGN GUIDELINES

HDPE rigids

BODY:
- use HDPE monolayer
- no carbon black colourisation

CAP:
- only use PP

LABELS:
- use labels from the same material (only PE)

DESIGN GUIDELINES

HDPE rigids Natural

	Yes! ☺ Full compatibility for reprocessing	Not conflicting 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material	HDPE; Multilayer HDPE with other PE (LLDPE, LDPE, MDPE).		Multilayers HDPE with PLA; PVC; PS; PET; PETG
Size		Items compacted < 5 cm	Items (compacted) < than 2 cm;
Colours	Natural (clear);	Light colours	Black Inner layer; Black; Carbon Black; Other dark colours
Barrier	EVOH < 6.0%wt + PE-g-MAH tie layers with MAH > 0.1%wt and EVOH:tie layer ratio ≤ 2; Enkase (fluorination);	EVOH > 6.0%wt + PE-g-MAH tie layers with MAH > 0.1%wt and EVOH:tie layer ratio ≤ 2; EVOH <1% with any other tie layers;	EVOH > 1% with any other tie layers; PA; PVDC; Aluminium
Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants, nucleating agents, peroxides) and density remains < 0,97 g/cm³	Mineral fillers (CaCO3, talc) not increasing density more than 0,97 g/cm³	Additives changing the material density > 1 g/cm³; Flame-retardant additives, plasticizers; Bio-/oxo-/photodegradable additives
Closure Systems	HDPE; LDPE; LLDPE; MDPE	PP; PET; PETG; PS; PLA (all with a density >1g/cm3).	Non-PO and/or foams with density <1g/cm3; Aluminium; Metal; PVC
Liners, Seals and Valves	HDPE; LDPE; LLDPE; MDPE; TPE-PE	PP;TPE-PP; PET, PETG, PS, PLA (all with a density >1g/cm3). Removable aluminium lidding; Removable silicon with density > 1 g/cm³	Non-PO and/or foams with density <1g/cm3; Any other TPE, Aluminium; Metal; Foiled paper; PVC
Labels	Labels in HDPE, LDPE, LLDPE, MDPE (all with density <1 g/cm³)* **with a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer*	Labels in PP (with density <1 g/cm³*; Labels in PET, PETG, PS, PLA (all with density >1 g/cm³)*; Labels in Paper without fibreloss during the recycling process*; PO-foamed labels* **with a size, a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer:* *- indication label size of bottles > 500 ml: < 70% coverage* *- indication label size of bottles ≤ 500 ml: < 50% coverage*	Labels that hinder the recognition of the PE; Labels in non PO-materials with density < 1 g/cm³; Paper labels with fibreloss during recycling process; Aluminium; Metallised labels; PVC
Sleeves	Sleeves in HDPE; LDPE; LLDPE; MDPE (all with density <1 g/cm³)* **with a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer*	Sleeves in PP (with density <1 g/cm³)*; Sleeves in PET, PETG, PS, PLA (all with density >1 g/cm³)* **with a size, a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer:* *- indication label size of bottles > 500 ml: < 70% coverage* *- indication label size of bottles ≤ 500 ml: < 50% coverage*	Sleeves that hinder the recognition of the PE; Sleeves in non PO-materials with density <1 g/cm3 ; Aluminium; Metallised sleeves; Heavily inked sleeves; PVC
Adhesives for labels	Water soluble or water releasable adhesive (@ less than 40°C)	Pressure sensitive labels	Non water soluble or non water releasable adhesives
Inks	Non toxic following the EuPIA Guidlines		Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked; Production or best-before date.		Any other direct printing
Other Components	HDPE, LDPE, LLDPE, MDPE	PP; PET; PETG; PS; PLA all with density >1 g/cm³.	Aluminium; PVC; Glass components; Foams with density < 1 g/cm3.

DESIGN GUIDELINES

HDPE rigids Coloured

	Yes! ☺ Full compatibility for reprocessing	Not conflicting 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material	HDPE; Multilayer HDPE with other PE (LLDPE, LDPE, MDPE).		Multilayers HDPE with PLA; PVC; PS; PET; PETG
Size		Items compacted < 5 cm	Items (compacted) < than 2 cm;
Colours	All colours	Black inner layer	Black; Carbon black;
Barrier	EVOH < 6.0%wt + PE-g-MAH tie layers with MAH > 0.1%wt and EVOH:tie layer ratio ≤ 2; Enkase (fluorination);	EVOH > 6.0%wt + PE-g-MAH tie layers with MAH > 0.1%wt and EVOH:tie layer ratio ≤ 2; EVOH <1% with any other tie layers;	EVOH > 1% with any other tie layers; PA; PVDC; Aluminium
Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants, nucleating agents, peroxides) and density remains < 0,97 g/cm³	Mineral fillers (CaCO3, talc) not increasing density more than 0,97 g/cm³	Additives changing the material density > 1 g/cm³; Flame-retardant additives, plasticizers; Bio-/oxo-/photodegradable additives
Closure Systems	HDPE; LDPE; LLDPE; MDPE	PP; PET; PETG; PS; PLA (all with a density >1g/cm3).	Non-PO and/or foams with density <1g/cm3; Aluminium; Metal; PVC
Liners, Seals and Valves	HDPE; LDPE; LLDPE; MDPE; TPE-PE	PP;TPE-PP; PET, PETG, PS, PLA (all with a density >1g/cm3). Removable aluminium lidding; Removable silicon with density > 1 g/cm³	Non-PO and/or foams with density <1g/cm3; Aluminium; Metal; Foiled paper; PVC
Labels	Labels in HDPE, LDPE, LLDPE, MDPE (all with density <1 g/cm³)* **with a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer*	Labels in PP (with density <1 g/cm³*; Labels in PET, PETG, PS, PLA (all with density >1 g/cm³)*; Labels in Paper without fibreloss during the recycling process*; PO-foamed labels* **with a size, a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer:* *- indication label size of bottles > 500 ml: < 70% coverage* *- indication label size of bottles ≤ 500 ml: < 50% coverage*	Labels that hinder the recognition of the PE; Labels in non PO-materials with density < 1 g/cm³; Paper labels with fibreloss during recycling process; Aluminium; Metallised labels; PVC
Sleeves	Sleeves in HDPE; LDPE; LLDPE; MDPE (all with density <1 g/cm³)* **with a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer*	Sleeves in PP (with density <1 g/cm³)*; Sleeves in PET, PETG, PS, PLA (all with density >1 g/cm³)* **with a size, a print and/or barrier that does not hinder the recognition of the underlaying PE-polymer:* *- indication label size of bottles > 500 ml: < 70% coverage* *- indication label size of bottles ≤ 500 ml: < 50% coverage*	Sleeves that hinder the recognition of the PE; Sleeves in non PO-materials with density <1 g/cm3 ; Aluminium; Metallised sleeves; Heavily inked sleeves; PVC
Adhesives for labels	Water soluble or water releasable adhesive (@ less than	Pressure sensitive labels	Non water soluble or non water releasable adhesives
Inks	Non toxic following the EuPIA Guidlines		Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked; Production or best-before date.	Any other direct printing	
Other Components	HDPE, LDPE, LLDPE, MDPE	PP PET; PETG; PS; PVC; PLA all with density >1 g/cm³.	Aluminium; PVC; Glass components; Foams with density < 1 g/cm³.

DESIGN GUIDELINES

LDPE flexibles

BODY:

- use light and transparent colours
- don‘t use inks

DESIGN GUIDELINES

LDPE flexibles Natural

	Yes! ☺ Full compatibility for reprocessing	Conditional 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material	PE-LD, PE-LLD; PE-HD	Multilayer PE/PP	any other polymer (ex. PET, PVC, etc.)
Colours	unpigmented; transparent	Light colours; translucent colours	dark colours; black; carbon black
Size	> A4 or > 50 x 50 mm once compacted		
Barrier	Barrier in the polymer matrix; SiOx and AlOx without additional coatings	< 5% EVOH (in polyolefinc combination film); metalized layers without coating; EcoLam High Plus; VO+ LLDPE	> 5% EVOH (in polyolefinc combination film); barrier layer PVC, PVDC, PA; any other barrier layer; foaming agents used as expandant chemical agents; aluminium
Additives	Additives that do not increase the density higher than 0,97 g/cm³		Bio-/oxo-/photodegradable additives Additives that do increase the density higher than 0,97 g/cm3 (CaCO3, talc, glass fibers, etc.)
Closure Systems	PE-LD, PE-LLD, PE-HD	PP	Metal, aluminium, PVC, , PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm^3
Liners, Seals and Valves	PE-LD, PE-LLD, PE-HD	PP, removable aluminium fasteners	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm^3
Labels	PE	PP, paper labels without fiberloss	Metallized labels, any other; paper labels with fibreloss
Adhesives	Water soluble or water-releasable at less than 60°C		Adhesives non-soluble in water or non-releasable in water at less than 60°C
Inks	No inks	Non-toxic (according to EUPIA guidelines)	Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked print; Printed production or expiry date	Printing covering < 50%**	Printing covering > 50%**
Other Attachments	PE-LD, PE-LLD, PE-HD	PP	Metal, aluminium, PVC, PET, PETG, PS, PLA paper, foams with density < 1 g/cm^3

**temporary solution

DESIGN GUIDELINES

LDPE flexibles Coloured

	Yes! ☺ Full compatibility for reprocessing	Conditional 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material	PE-LD, PE-LLD; PE-HD	Multialyer PE/PP	Any other polymer (ex. PET, PVC, etc.)
Colours	light colours; translucent colours	NIR-detectable dark colours (Sorting test)	Non NIR-detectable dark colours
Size	> A4 or > 50 x 50 mm once compacted	< A4 format or between 20 x 20 and 50 x 50 mm once compacted (Sorting test)	< 20 x 20 mm
Barrier	barrier in the polymer matrix; SiOx and AlOx without additional coatings	< 5% EVOH (in polyolefinc combination film); metalized layers; EcoLam High Plus; VO+ LLDPE	> 5% EVOH (in polyolefinc combination film); barrier layer PVC, PVDC, PA; any other barrier layer; foaming agents used as expandant chemical agents; aluminium
Additives	Additives that do not increase the density higher than 0,97 g/cm³		Bio-/oxo-/photodegradable additives; additives concentration > 0,97 g/cm^3
Closure Systems	PE-LD, PE-LLD, PE-HD	PP	Metal, aluminium, PVC, PET, PETG, PS, PLAnon PO or foams with density < 1 g/cm^3
Liners, Seals and Valves	PE-LD, PE-LLD, PE-HD	PP, removable aluminium fasteners	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm^3
Labels	PE	PP, paper labels without fiberloss	Metallized labels, any other; paper labels with fibreloss
Adhesives	Water soluble or water-releasable at less than 60°C		Adhesives non-soluble in water or non-releasable in water at less than 60°C
Inks	No inks	Non-toxic (according to EUPIA guidelines)	Inks that bleed; Toxic or hazardous inks.
Direct Printing	Laser marked print; Printed production or expiry date; printing covering < 50%**	printing covering > 50%**	
Other Attachments	PE-LD, PE-LLD, PE-HD	PP , PET, PETG, PS, PLA	Metal, aluminium, PVC, paper, foams with density < 1 g/cm^3

**temporary solution

DESIGN GUIDELINES

PS
polystyrene

BODY:

- use light and transparent colours
- just minimal printing

DESIGN GUIDELINES

	Yes! ☺ Full compatibility for reprocessing	Not conflicting 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
Main Material	PS		
Colours	Clear or lightly tinted colours	Opaque	Dark colorants with carbon black
Closure Systems	PS; OPS; PBT/PS; PS with PE insert; PS with EVA insert	Polyolefins, lightweight aluminium foil Ligfhtweight lidding films: Metalized PET; metalized OPP; combi PET/light paper;	Heavyweight aluminium foil; Multilayers; PET; PETG; PVC; Aluminium/steel;
Labels and Adhesives	PS; PS/OPS (same density as main material)	Polyolefin; Paper; IML Non-PS-cover with Packaging > 500 ml: < 70% coverage area and Packaging ≤ 500 ml: < 50% coverage on surface; Adhesives water soluble	PET; PETG; PVC; metalised labels; Adhesives not soluble in water
Inks		Non toxic following the EuPIA Guidlines	Inks that bleed; toxic or hazardous inks

PS is only being recycled in a limited amount of countries

PS polystyrene

DESIGN GUIDELINES

Paper & cardboard

BODY:

- use only paper
- water based inks

DESIGN GUIDELINES

	Yes! ☺ Full compatibility for reprocessing	Not conflicting 😐 Limited compatibility for reprocessing	No ☹ Low (or no) compatibility for reprocsssing
General (according to DIN643)	natural fibre-based paper and board suitable for recycling;	Unwanted material (outthrows) max 1.5% Non-paper components, paper and board not according to grade defintion, paper and board conflicting with production, paper not suitable for de-inking	Prohibited Material (any material which present a hazard for health, safety and environment, such as medical waste, contaminated products of personal hygiene, hazardous waste, organic waste including foodstuffs, bitumen, toxic powders and similar)
Main Material	Paper fibres	Polyolefins (PE, PP); Aluminium	
Colours		Suitable for de-inking	Non-de-inking
Coating & laminations	Without coating or lamination	One-sided plastic coating or plastic laminate, if fibre content is > the country specific threshold	Two-sided plastic coating or plastic laminate, if fibre content < country specific threshold
Barrier		Coating	Foil lined papers
Labels and Adhesives	Hotmelts with a softening point > 68°C and layer thickness of > 120µm	Water soluble adhesives	Insoluble adhesives; heavy foils; Latex/Hotmelt; Self-Adhesive; Polycoat Wax; Hotmelts with a softening point < 68°C
Addtivies	mineral filler (talc, kaolin, TiO_2, starch,calcium carbonate)		Wet strength agents, as far as fibre recovery and recycling is not proven; components of EuPIA
Inks		Non toxic following the EuPIA Guidlines	Inks that bleed; toxic or hazardous inks (Inks that are on the EuPIA exclusion list)

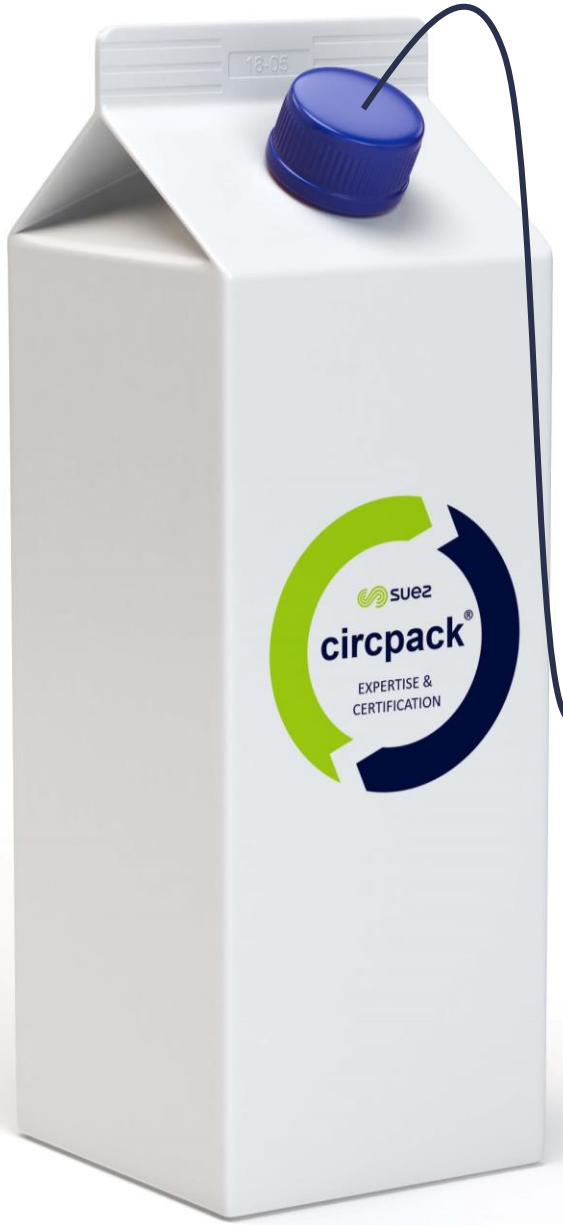
In a lot of countries combination of cardboard and plastic is not allowed in the collection system

Paper & cardboard

DESIGN GUIDELINES

Drinking cardboard

BODY:
- only paper, aluminium and polyolefins



CAP:
- only aluminium and polyolefins

DESIGN GUIDELINES

Drinking cardboard

	Yes! ☺	Not conflicting 😐	No ☹
	Full compatibility for reprocessing	**Limited compatibility for reprocessing**	**Low (or no) compatibility for reprocsssing**
Main Material	Paper fibres	Polyolefins (PE, PP), aluminium	
Colours	All colours		
Barrier		Polyolefins (PE, PP), aluminium	Wax, any other barrier solution except aluminium and polyolefins
Closure Systems		Polyolefins (PE, PP), aluminium	
Labels and Adhesives			Insoluble dispersing adhesives, Latex, hotmelt and wet-strength adhesives
Inks		Non toxic following the EuPIA Guidlines	Inks that bleed; toxic or hazardous inks (Inks that are on the EuPIA exclusion list), metal inks
Other Components		Wet strength agents, as far as fibre recovery and recycling is not proven; components of EuPIA	

DESIGN GUIDELINES

Glass

BODY:

- Use transparent glass
- Do not print directly on the glass

LABEL:

- use small and washable labels

DESIGN GUIDELINES

Glass

	Yes! ☺	Not conflicting 😐	No ☹
	Full compatibility for reprocessing	**Limited compatibility for reprocessing**	**Low (or no) compatibility for reprocsssing**
Main Material	Glas; Ferro metals, Non-ferro metals	Glas composities with metal or plastic layers	Pyrex (oven-proof glass), chrystal
Colours	All colours (focus to the separately collected colours white, green and brown)		
Closure Systems	Polyolefins and metals (including aluminium)	Other	
Labels and Adhesives		All	
Inks			Heavy metal inks;
Direct Printing		Solid colours direct print on glass	
Other Components			

DESIGN GUIDELINES

Metal
ferro

+ avoid residues after usage

DESIGN GUIDELINES

Metal non-ferro

+ avoid residues after usage

Summary

- Use light or transparent colours
- Avoid material mix and use mono-material instead
- Use barriers, labels, caps, … which are compatible with the recycling of the major material
- Optimize labels and caps
- Make sure that the different (material) components get separated while sorting
- Don‘t use substances hazardous to recycling (bleeding inks, not washable glues, labels from different material, additives, silicon, …)

Disclaimer:

Going Further - Our support for you:

Do not hesitate to contact us!
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