

Design For Recycling

GUIDELINES for packaging

CIRCPACK
by  **VEOLIA**

Design For Recycling

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Having performed its primary functions, **packaging inevitably becomes waste.**

As **resources are limited**, it becomes more and more **important** to make these used materials **recyclable**.
That's how we can give them a **circular life**.

Enabling recycling 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.

Give packaging a second life,
design for recycling!

Design For Recycling

THE 4 ESSENTIAL STEPS IN RECYCLING

Recyclability only truly exists when it is part of our day-to-day operations.

Before we consider a packaging to be 'recyclable', four **ESSENTIAL STEPS IN RECYCLING** have to be met:



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

GUIDELINES

On the following pages you will find a detailed description of materials that are wanted and unwanted in your packaging design.

These guidelines are based on years of experience and research on the effect of material-combinations on **1)** sorting, **2)** reprocessing and **3)** the properties of recycled material.

There are guidelines for a lot of **different materials**. Please check the material of which the **main component** of your packaging is made.

Design For Recycling

GUIDELINES for packaging

* Decorative technologies must not hinder the recognition of the underlying PET-polymer, such as size, print, mass colouration and/or barrier. The following size indications can be considered to ensure the recognition of PET:

- Size of non-PET surfaces on containers > 500 ml: < 70% coverage
- Size of non-PET surfaces on containers < 500 ml: < 50% coverage

The DfR guidelines for plastic packaging are 100% aligned with....

RecyClass

For more info, please visit <https://recyclass.eu/>

CIRCPACK
by VEOLIA

Material:

PET bottles

Clear

- PET thermoform
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material	PET		PLA; PVC; PS; PETG; PC, PBT
	Colours	Transparent clear , transparent light blue		Other transparent colours; Opaque; Fluorescence; Metallic
	Size			< 4 cm (compacted); > 5 liter content
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index Easy-to-empty <20%; E< if index is 25%; F if index is> 25%
	Barrier	SiOx plasma coating	Carbon plasma-coating; PA-MXD6 multilayer with <5wt% PA-MXD6 and no tie layers; PGA multilayer; PTN alloy	PA-MXD6 multilayer with >5wt% PA-MXD6 or with tie layers; Monolayer PA-MXD6 blend; EVOH
Attachments	Additives		UV stabilisers; Acetaldehyde (AA) blockers; Optical brighteners; Oxygen scavengers	Bio-/oxo-/photodegradable additives; Nanocomposites
	Closure Systems	PE (with density <1 g/cm ³); PP (with density <1 g/cm ³)		Materials and blends with density >1 g/cm ³ (e.g. highly filled PE, metals,...); Non-detaching or welded closures
	Liners, Seals, Valves	PE; PE + EVA; PP; TPO (all with a density < 1 g/cm ³); TPS (with density < 0.95 g/cm ³)	Foamed PET (all with a density < 0.95 g/cm ³); Floatable silicone (with density < 0.95 g/cm ³)	Materials with density >1 g/cm ³ (e.g. PVC, silicone, metals)
	Other Components	Base cup, handles or other components which are separated by grinding and float/sink - density <1 g/cm ³		Materials with density >1 g/cm ³ (e.g. metal, RFID tags); Non detaching or welded components; Coloured PET
Decoration*	Facestock for Label Materials	PE; PP; OPP (all with density <1 g/cm ³)	EPS; foamed PET; Lightly metallized labels (all with density <0.95 g/cm ³); Paper labels without fiberlosses	Labels with density >1 g/cm ³ (PVC; PS; PET; PETG; PLA); Metallized labels; Non-detaching or welded labels; Paper labels with fibreloss; Foamed PETG labels; PET labels with washable inks
	Adhesives for labels	Alkali/water releasable adhesive at 70-90°C		Alkali/water soluble adhesive; Alkali/water non-soluble or non-releasable adhesive at 70-90°C
	Sleeves	PE; PP; OPP (all with density <1 g/cm ³)	Full sleeves translucent for IR detection in PE; PP; OPP (all with density <1 g/cm ³); EPS; Foamed PET; LDPET (all with density <0.95 g/cm ³)	Sleeves which hinder the recognition of the underlying PET-polymer; with density >1 g/cm ³ (PVC; PS; PET; PETG); Foamed PETG sleeves; PET sleeves with washable inks
	Tamper Evidence Wrap	PE; PP; OPP (all with density <1 g/cm ³)	EPS; Foamed PET; LDPET (all with density <0.95 g/cm ³)	Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; Metallic inks; Washable inks; Any other direct printing
	Inks	Retentive inks compliant with EuPIA Exclusion Policy; Inks applied on removable labels/sleeves	Production or expiry date (direct printing)	Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; Metallic inks; Washable inks; Any other direct printing
Other Decorative Technologies	Laser marked print or expiry date		Any other laser marking	

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 - Size of non-PET surfaces on containers < 500 ml: < 50% coverage

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Material:

PET bottles

Coloured

- PET thermoform
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility	
Main body	Material	PET	PLA; PVC; PS; PETG; PC; PBT	
	Material composition	A when PET content is > 95%; B when PET content is > 90% and all packaging features are FULLY compatible with recycling	C when PET content is > 70% and all packaging features are FULLY compatible with recycling	D when PET content is > 50%; E when PET content is > 30%; F when PET content is < 30%
	Colours	Transparent light colours	Transparent dark colours	Opaque; Fluorescence; Metallic
	Size			< 4 cm (compacted); > 5 liter content
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index Easy-to-empty is < 20%; E if index is < 25%; F if index is > 25%
	Barrier	SiOx coating; Carbon plasma-coating; PTN alloy; PA-MXD6 multilayer with < 6wt% PA-MXD6 and no tie layer	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 stabilisers; Acetaldehyde (AA) blockers; Optical brighteners; Oxygen scavengers	Bio-/oxo-/photodegradable additives; Nanocomposites
Attachments	Closure Systems	PE (with density < 1 g/cm ³); PP (with density < 1 g/cm ³)	Materials and blends with density > 1 g/cm ³ (e.g. highly filled PE, metals,...); Non-detaching or welded closures	
	Liners, Seals, Valves	PE; PE + EVA; PP; TPO (all with a density < 1 g/cm ³); TPS (with density < 0.95g/cm ³)	Foamed PET (with density < 0.95g/cm ³); Floatable silicone (with density < 0.95g/cm ³)	Materials with density > 1 g/cm ³ (e.g. PVC, silicone, metals)
	Other Components	Base cup, handles or other components which are separated by grinding and float/sink - all with density < 1 g/cm ³ ; PET		Materials with density > 1 g/cm ³ (e.g. metal, RFID tags); Non-detaching or welded components
Decoration*	Inks	Retentive inks compliant with EuPIA Exclusion Policy; Inks applied on removable labels/sleeves	Production or expiry date (direct printing)	Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; Metallic inks; Washable inks; Any other direct printing
	Facestock for Label Materials	PE; PP; OPP (all with density < 1 g/cm ³)	EPS; foamed PET; Lightly metallized labels (all with density < 0.95 g/cm ³); Paper labels without fibrelosses	Labels which hinder recognition of underlying PET-polymer; with density > 1 g/cm ³ ; Metallized labels; Non-detaching or welded labels; Paper labels with fibreloss; Foamed PETG labels; PET labels with washable inks
	Adhesives for labels	Alkali/water releasable adhesive at 70-90°C	Hot-melts; Pressure-sensitive labels	Alkali/water soluble adhesive; Alkali/water non-soluble or non-releasable adhesive at 70-90°C
	Sleeves	Sleeves in PE; PP; OPP (all with density < 1 g/cm ³)	Full sleeves translucent for IR detection in PE; PP; OPP (all with density < 1 g/cm ³); EPS; foamed PET; LDPET (all with density < 0.95 g/cm ³)	Sleeves which hinder the recognition of the underlying PET-polymer; with density > 1 g/cm ³ (PVC; PS; PET; PETG); Foamed PETG sleeves; PET sleeves with washable inks
	Tamper Evidence Wrap	PE; PP; OPP (all with density < 1 g/cm ³)	EPS; Foamed PET, LDPET (all with density < 0.95 g/cm ³)	Materials with density > 1 g/cm ³ (e.g. metal; PVC; PS; PETG); Foamed PETG (even with density < 1 g/cm ³); PET with washable inks
	Decorative Techs	Laser marking for production or expiry date		Any other laser marking

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- Size of non-PET surfaces on containers > 500 ml: < 70% coverage
- Size of non-PET surfaces on containers < 500 ml: < 50% coverage

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RecyClass

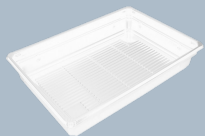
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Material:

- PET bottles
- PET thermoform**
Clear
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility	
Main body	Material	PET Thickness >180 microns	PET/PE multilayer with or without barrier not hindering NIR detection of the PET	Any PET based multilayer inc PET/PE; PLA; PVC; PS; PETG; C-PET; PET-GAG; Expanded PET. Thickness <180 microns
	Material composition	A when PET content is > 95%; B when PET content is > 90% and all packaging features are FULLY compatible with recycling	C when PET content is > 70% and all packaging features are FULLY compatible with recycling	D when PET content is > 50%; E when PET content is > 30%; F when PET content is < 30%
	Colours	Transparent clear		Other transparent colours; Opaque; Metallic
	Size		Items compacted < 5 cm	Items compacted < than 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	PET based oxygen scavenger without yellowing effect; SiOx and AlOx plasma for barrier on lid; For multilayers: Barrier material within PE layer (i.e PE/EVOH/PE) or with barrier material blended in PE	PET based oxygen scavenger with limited yellowing effect	Barrier layers within the PET layer or in direct contact to PET layer; PA; any other barrier; any other oxygen scavenger
	Additives	Silicone surface coating; Antiblocking masterbatch ≤ 3%	UV stabilisers; AA blockers; optical brighteners; antiblocking masterbatch (> 3%); anti-stat agents; anti-fogging agents	Bio-/oxo-/photodegradable additives; Nanocomposites
Laminating Adhesives	Water-based Acrylics	EVA	Solvent-free	
Attachments	Closure Systems; Lidding films	Floating plastics with density < 1 g/cm ³ and easily removal from the tray and without glue residuals;	Unprinted PET or BOPET films; Foamed PET	Any other films
	Other Components	PET Trays with porous enabling liquid retention	Soaker pads & bubble pads easily removable by hands; Soaker pads not hindering recognition of the underlying PET polymer by covering less than 50% of the back of the tray (sorting test mandatory above 50% coverage); Black soaker pads (sorting test)	PVC / PS / EPS / PU / PA; PC/PMMA; Thermoset plastics/metals; Soaker pads & bubble pads not easily removable by hands or leaving residue glue
Decoration*	Inks	Retentive inks compliant with EuPIA Exclusion Policy applied on removable parts; Inks applied on fully removable lids and labels	Production or expiry date directly applied on tray	Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; PVC co- and terpolymer binders; Any other chlorinated binders; Any direct printing on PET thermoform
	Labels	Labels in PE; PP; OPP (all with density <1 g/cm ³ and also in the more heavily printing area), with a size that does not hinder* the recognition of the underlying PET-polymer (ie < 50% coverage)	BPA-free paper labels without fibreloss during recycling process Labels with a coverage >50% (sorting test)	Plastic labels with density > 1 g/cm ³ ; Paper labels with fibreloss during recycling process; Paper labels containing BPA; Non floating paper labels
	Adhesives (for lids, labels,...)	Alkali/water soluble or alkali/water releasable adhesive at 70°C	Alkali/water soluble or alkali/water partially releasable adhesive at 70°C	Any other adhesives
	Other Decorative Technologies	Laser marking for production or expiry date		Any other laser marking

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- Size of non-PET surfaces on containers > 500 ml: < 70% coverage
- Size of non-PET surfaces on containers < 500 ml: < 50% coverage

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Material:

• PET bottles

PET thermoform

Coloured

• PP rigids

• PP flexibles

• PE rigids

• PE flexibles

• PS

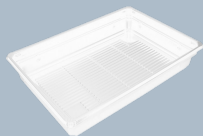
• Paper & cardboard

• Beverage cartons

• Glass

• Steel

• Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material	PET Thickness >180 microns	PET/PE multilayer with or without barrier not hindering NIR detection of the PET	Any PET based multilayer inc PET/PE; PLA; PVC; PS; PETG; C-PET; PET-GAG; Expanded PET. Thickness <180 microns
	Material composition	A when PET content is > 95%; B when PET content is > 90% and all packaging features are FULLY compatible with recycling	C when PET content is > 70% and all packaging features are FULLY compatible with recycling	D when PET content is > 50%; E when PET content is > 30%; F when PET content is < 30%
	Colours	Transparent & opaque light colours	Dark Colours (NIR Detectable)	Black, Metallic, Non NIR-detectable colours
	Size		Items compacted < 5 cm	Items compacted < than 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	PET based oxygen scavenger without yellowing effect; SiOx and AlOx plasma for barrier on lid; For multilayers: Barrier material within PE layer (i.e PE/EVOH/PE) or with barrier material blended in PE	PET based oxygen scavenger with limited yellowing effect	Barrier layers within the PET layer or in direct contact to PET layer; PA; any other barrier; any other oxygen scavenger
	Additives	Silicone surface coating; Antiblocking masterbatch ≤ 3%	UV stabilisers; AA blockers; optical brighteners; antiblocking masterbatch (> 3%); anti-stat agents; anti-fogging agents	Bio-/oxo-/photodegradable additives; Nanocomposites
Laminating Adhesives	Water-based Acrylics	EVA	Solvent-free	
Attachments	Closure Systems; Lidding films	Floating plastics with density < 1 g/cm³ and easily removal from the tray and without glue residuals;	Unprinted PET or BOPET films; Foamed PET	Any other films
	Other Components	PET Trays with porous enabling liquid retention	Soaker pads & bubble pads easily removable by hands; Soaker pads not hindering recognition of the underlying PET polymer by covering less than 50% of the back of the tray (sorting test mandatory above 50% coverage); Black soaker pads (sorting test)	PVC / PS / EPS / PU / PA; PC/PMMA; Thermoset plastics/metals; Soaker pads & bubble pads not easily removable by hands or leaving residue glue
Decoration*	Inks	Retentive inks compliant with EuPIA Exclusion Policy applied on removable parts; Inks applied on fully removable lids and labels	Production or expiry date directly applied on tray	Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; PVC co- and terpolymer binders; Any other chlorinated binders; Any direct printing on PET thermoform
	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 underlying PET-polymer (ie < 50% coverage)	BPA-free paper labels without fibreloss during recycling process Labels with a coverage >50% (sorting test)	Plastic labels with density > 1 g/cm³; Paper labels with fibreloss during recycling process; Paper labels containing BPA; Non floating paper labels
	Adhesives (for lids, labels,...)	Alkali/water soluble or alkali/water releasable adhesive at 70°C	Alkali/water soluble or alkali/water partially releasable adhesive at 70°C	Any other adhesives
	Other Decorative Technologies	Laser marking for production or expiry date		Any other laser marking

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 - Size of non-PET surfaces on containers < 500 ml: < 50% coverage

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RecyClass

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Material:

- PET bottle
- PET thermoform

PP rigid

Natural & white

- PP flexible
- PE rigid
- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material*	PP, <u>TPO <= 10 % (full olefinic or aliphatic structure)</u> ; TPS<=10%	<u>PE ≤ 10%</u>	Multilayers with PLA; PVC; PS; PET; PETG; <u>PE > 10%</u> , TPO (containing rubber, e.g. EPDM)
	Colours	Natural (clear); White	Light colours	Black Inner layer; Black; Carbon Black; Other dark colours
	Size		Items compacted ≤ 5 cm	Items compacted ≤ than 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	<u>EVOH ≤ 6% + PP-g -MAH tie layers</u> with MAH ≥ 0.1wt% and EVOH:tie layers ratio ≤ 2;	<u>EVOH > 6% + PP-g -MAH tie layers</u> with MAH ≥ 0.1wt% and EVOH:tie layers ratio ≤ 2;	EVOH with different tie layers; PA; PVDC; Aluminium; Metallisation
	Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants...) and density remains <0.97 g/cm³	Mineral fillers (CaCO ₃ , talc) not increasing density more than 0,97 g/cm³	Additives changing material density >1 g/cm³; Flame retardant additives, plasticizers; Bio-/oxo-/photodegradable additive
Attachments	Laminating adhesives	Laminating adhesives <u>approved</u> as fully compatible by RecyClass; To be tested if in combination with a barrier material, Aliphatic PU <= 2.3 wt%	Aliphatic PU between 2.3 and 4.5 % Laminating adhesives <u>approved</u> as limited compatible by RecyClass; To be tested if in combination with a barrier material	PU > 4.5% ; Aromatic PU; To be tested: Acrylics; Laminating adhesives specially developed for high thermal applications above boiling and/or for high chemical resistance
	Closure Systems	PP	HDPE; LDPE; LLDPE; MDPE; PET; PETG; PS; PLA (all with a density >1g/cm³), Removable aluminium lidding	Non-PO and/or foams with density < 1 g/cm³; Aluminium; Metal; PVC
	Liners, Seals and Valves	PP; TPO; <u>TPS</u> ; PO Foamed	HDPE; LDPE; LLDPE; MDPE; TPS; PET; PETG; PLA, PS (d>1 g/cm³); removable silicon with d>1 g/cm³; <u>PO foamed ≤ 1%</u>	Non-PO and/or foams with density < 1 g/cm³; Any other TPE ; Aluminium; Metal; Foiled paper; PVC
Decoration*	Other Components	PP	PE with density <1 g/cm³; PET; PETG; PS; PLA (d >1 g/cm³)	Aluminium; PVC; Glass components; Non-PO and /or foams with d< 1 g/cm³
	Inks	Non-bleeding inks compliant with <u>EuPIA Exclusion Policy</u> ; Direct printing for production or expiry date		Inks that bleed; Inks non-compliant with EuPIA Exclusion Policy; PVC binders
	Facestock for label materials	Removable labels in PP (all with density < 1 g/cm³)	Removable labels in PE, PO (with d< 1 g/cm³); Removable labels in PET, PETG, PLA, PS (all with d > 1 g/cm³); removable labels in Paper without fibre loss; Removable PO-foamed labels	Non or partially removable labels; labels that hinder PP recognition; labels in non PO-materials with d < 1 g/cm³; paper labels with fibre loss; alu; Metallised labels; <u>IML</u> ; PVC
	In-mould Labels	<u>Releasable in the recycling process</u>		Non releasable
	Adhesives for labels	<u>Releasable in the recycling process</u>		Non releasable
	Sleeves	Sleeves in PO (all with density < 1 g/cm³), <u>Self-separable plastic and cardboard sleeves under mechanical stress (sorting test mandatory)</u>	Sleeves in PE (density < 1 g/cm³); Sleeves in PET, PETG, PET-C, PLA, PS (density > 1 g/cm³), Cardboard sleeves without fiber loss (<u>sorting test</u> mandatory)	Sleeves that hinder the PP recognition; Sleeves in non-PO materials with d< 1 g/cm³ ; Cardboard sleeves with fiber loss; Aluminium; Metallised sleeves; PVC
Other Decorative Tech	Laser marked for production or best-before date	Electroplating on attachments (with density > 1 g/cm³)	Electroplating on attachments (with density <1 g/cm³)	

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Material:

- PET bottle
- PET thermoform

PP rigid

Coloured

- PP flexible
- PE rigid
- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material*	PP TPO <= 10 % (full olefinic or aliphatic structure); TPS<=10%	PE ≤ 10%	Multilayers with PLA; PVC; PS; PET; PETG; PE > 10%, TPO (containing rubber, e.g EPDM)
	Colours	All colours	Black inner layer and dark colours (NIR-detectable)	Non NIR detectable colours
	Size		Items compacted ≤ 5 cm	Items compacted ≤ 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	EVOH ≤ 6% + PP-g -MAH tie layers with MAH ≥ 0.1wt% and EVOH:tie layers ratio ≤ 2;	EVOH > 6% + PP-g -MAH tie layers with MAH ≥ 0.1wt% and EVOH:tie layers ratio ≤ 2; EVOH ≤ 1% with any other tie layers; Metallisation	EVOH > 1% with different 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 (CaCO ₃ , talc) not increasing density more than 0,97 g/cm³	Additives changing material density >1 g/cm³; Flame retardant additives, plasticizers; Bio-/oxo-/photodegradable additive
Laminating adhesives	Acrylics <= 2.5 %; PU < 3 %; Laminating adhesives approved as fully compatible by RecyClass; To be tested if in combination with other barrier material than metallisation,	Laminating adhesives approved as limited compatible by RecyClass; To be tested if in combination with a barrier material, PU between 3 and 4.5 wt%	PU > 4.5wt% ; To be tested: Acrylics; Laminating adhesives specially developed for high thermal applications above boiling and/or for high chemical resistance	
Attachments	Closure Systems	PP	HDPE; LDPE; LLDPE; MDPE; PET; PETG; PS; PLA (all with a density >1g/cm³), Removable aluminium lidding	Non-PO and/or foams with density < 1 g/cm³; Aluminium; Metal; PVC
	Liners, Seals and Valves	PP; TPO; TPS <= 1%; PO Foamed	HDPE; LDPE; LLDPE; MDPE; TPS; PET; PETG; PLA, PS (d>1 g/cm³); removable silicon with d>1 g/cm³; PO foamed <= 1%	Non-PO and/or foams with density < 1 g/cm³; Any other TPE ; Aluminium; Metal; Foiled paper; PVC
	Other Components	PP	PE with density <1 g/cm³; PET; PETG; PS; PLA (d >1 g/cm³)	Alu; PVC; Glass; Non-PO and/or foams with d < 1 g/cm³;
Decoration*	Inks	Non-bleeding inks compliant with EuPIA Exclusion Policy; Inks & lacquer for direct printing representing <1 total wt%	More than 1 wt% direct printing (to be tested)	Inks that bleed; Inks non-compliant with EuPIA Exclusion Policy; PVC binders
	Facestock Label Materials	PP (all with density < 1 g/cm³)	PE, PO (with density < 1 g/cm³); PET, PETG, PLA, PS (all with density > 1 g/cm³); Paper without fibreloss; PO-foamed	Labels that hinder PP recognition; labels in non PO-materials with d < 1 g/cm³ ; Paper labels with fibreloss; alu; metallised labels; PVC
	Adhesives for labels	Releasable in the recycling process	Non-releasable adhesive approved by RecyClass in combination with filmic PO labels	Non releasable
	Sleeves	Sleeves in PO (all with density < 1 g/cm³), Self-separable plastic and cardboard sleeves under mechanical stress (sorting test mandatory)	Sleeves in PE (density < 1 g/cm³); Sleeves in PET, PETG, PET-C, PLA, PS (density > 1 g/cm³), Cardboard sleeves without fiberloss (sorting test mandatory)	Sleeves that hinder the PP recognition; Sleeves in non-PO materials with d < 1 g/cm³ ; Cardboard sleeves with fiberloss; Aluminium; Metalised sleeves; Heavily inked sleeves; PVC
	Other Decorative Tech	Laser marking	Electroplating on attachments (with density > 1 g/cm³); Cold transfer and hot stamping technologies not hindering detection	Electroplating on attachments (with density <1 g/cm³)

Design For Recycling

GUIDELINES for packaging

* Polymer resin can be fossil or bio-based, virgin or recycled
 ** Nitrocellulose (NC) based inks impact on recyclability is under investigation by RecyClass.
 *** Temporary Solution

The DfR guidelines for plastic packaging are 100% aligned with...
 For more info, please visit <https://recyclass.eu/>

RecyClass

CIRCPACK
 by VEOLIA

Material:

- PET bottle
- PET thermoform
- PP rigid

PP flexible

- PE rigid Transparent
- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material*	Oriented and non-oriented PP (including PP-plastomers)	Multilayer PP/PE with PE ≤ 10%	Any other polymer (ex. PET, PVC, etc.)
	Colours	Unpigmented; transparent	Light colours; translucent colours	Dark colours; black; carbon black
	Size	Packaging surface > 100 cm²	Packaging surface between 30 and 100 cm²	Packaging surface < 30cm²
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	SiOx and AlOx without additional coatings	≤ 5% EVOH (in polyolefinic combination film);	> 5% EVOH (in polyolefinic combination film); Barrier layer PVC, PVDC, PA; AlOx coating with PVOH primer ; any other barrier layer; metallisation ; aluminium
	Additives	Additives that do not increase the density higher than 0,97 g/cm³		PBT Voiding Agent; Bio-/oxo-/photodegradable additives; foaming agents used as expandant chemical agents; Additives not increasing density >0,97 g/cm³ (CaCO3, talc, glass fibers).
	Laminating adhesives	Aliphatic polyurethanes ≤ 2.3 % ; Laminating adhesives approved as fully compatible by RecyClass ; To be tested if in combination with a barrier material	Aliphatic polyurethanes between 2.3% and 4.5% ; Water Based Acrylics ≤2.5%; Laminating adhesives approved as limited compatible by RecyClass ; To be tested if in combination with a barrier material other than EVOH	Aliphatic polyurethanes > 4.5% ; Water-based acrylics >2.5%; Aromatic polyurethanes (to be tested); Laminating adhesives specially developed for high thermal applications above boiling and/or for high chemical resistance (to be tested); Any other laminating adhesives
Attachments	Closure Systems	PP (including PP-plastomers)	PE	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm³
	Liners, Seals and Valves	PP (including PP-plastomers)	PE, removable aluminium liddings	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm³
	Other Components	PP (including PP-plastomers)	PE	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm³
Decoration	Inks**	Non-bleeding inks compliant with EuPIA Exclusion Policy; Printed production or expiry date	Printing with coverage < 50 %***	Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; PVC co- and terpolymer binders; Any other chlorinated binders; Printing covering > 50% ***
	Facestock Label Material	PP	PE	Metallized labels, any other; paper labels
	Adhesives for labels	Water soluble or water-releasable at less than 40°C		Adhesives non-soluble in water or non-releasable in water <40°
	Other Decorative Technologies	Laser marking for production or expiry date	Laser marking with coverage < 50 %***	

Design For Recycling

GUIDELINES for packaging

* Polymer resin can be either fossil- or bio-based, virgin or recycled.
 ** Nitrocellulose (NC) based inks impact on recyclability is under investigation by RecyClass.
 *** Temporary Solution

The DfR guidelines for plastic packaging are 100% aligned with....
 For more info, please visit <https://recyclass.eu/>

RecyClass

CIRCPACK
 by VEOLIA

Material:

- PET bottle
- PET thermoform
- PP rigid

PP flexible

Coloured

- PE rigid
- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility	
Main body	Material*	Oriented and non-oriented PP (including PP-plastomers)	Multilayer PP/PE with PE ≤ 10%	Any other polymer (ex. PET, PVC, etc.)
	Colours	Light colours; translucent colours	NIR-detectable dark colours (Sorting test)	Non NIR-detectable dark colours
	Size	Packaging surface > 100 cm²	Packaging surface between 30 and 100 cm²	Packaging surface < 30cm²
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E if index 25%; F if index > 25%
	Barrier	SiOx and AlOx without additional coatings	≤ 5% EVOH (in polyolefinic combination film); metallisation	>5% EVOH (in polyolefinic combination film); Barrier layer PVC, PVDC, PA; AlOx coating with PVOH primer ; any other barrier layer; aluminium
	Additives	Additives that do not increase the density higher than 0,97 g/cm³	PBT Voiding Agent <5%	Bio-/oxo-/photodegradable additives; Additives that do increase the density higher than 0,97 g/cm³ (CaCO₃, talc, glass fibers...)
	Laminating adhesives	Polyurethanes ≤ 3 %; Water Based Acrylics ≤ 2.5%; Laminating adhesives approved as fully compatible by RecyClass ; To be tested if in combination with other barrier material than metallisation	Polyurethanes between 3 and 4.5%; Laminating adhesives approved as limited compatible by RecyClass ; To be tested if in combination with other barrier material than metallisation	Polyurethanes > 4.5% ; To be tested: Acrylics >3%; Laminating adhesives specially developed for high thermal applications above boiling and/or for high chemical resistance; Any other laminating adhesives
	Attachments	Closure Systems	PP (including PP-plastomers)	PE
Liners, Seals and Valves		PP (including PP-plastomers)	PE, removable aluminium liddings	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm³
Other Components		PP (including PP-plastomers)	PE	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm³
Decoration	Inks*	PU-based inks (with no NC); Inks & Varnish < 5% Non-bleeding inks compliant with EuPIA Exclusion Policy;	< 0.8% of NC-binders** Inks & Varnish 5 - 7 %	> 0.8% of NC-binders; Inks & varnish > 7 %; Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; PVC co- and terpolymer binders; Any other chlorinated binders
	Facestock Label Materials	PP	PE	Metallized labels, any other; paper labels
	Adhesives for labels	Water soluble or water-releasable at less than 40°C		Adhesives non-soluble in water or non-releasable in water at less than 40°C
	Direct Printing	Laser marking with coverage < 50 %***	Laser marking with coverage > 50 % ***	

Design For Recycling

GUIDELINES for packaging

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

**Decorative technologies must not hinder the recognition of the underlying PET-polymer, such as size, print, mass colouration and/or barrier. The following size indications can be considered to ensure the recognition of PET:

- Size of non-PET surfaces on containers > 500 ml: < 70% coverage
- Size of non-PET surfaces on containers < 500 ml: < 50% coverage

The DfR guidelines for plastic packaging are 100% aligned with....

RecyClass

For more info, please visit <https://recyclclass.eu/>

CIRCPACK

by  VEOLIA

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible

PE rigid

Natural&white

- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material*	HDPE; Multilayer PE with HDPE prevalence (LLDPE, LDPE, MDPE) <u>TPO <= 10 % (full olefinic or aliphatic structure); TPS <= 5 %</u>	PP <= 10% 5% < TPS <=10%	Multilayers HDPE with PLA; PVC; PS; PET; PETG; <u>10% < PP <= 30% (- 2 classes); PP > 30% (-3 classes)</u> , TPO (containing rubber, e.g. EPDM)
	Colours	Natural (clear); White	Light colours	Black Inner layer; Black; Carbon Black; Other dark colours
	Size		Items compacted ≤ 5 cm	Items compacted < than 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	<u>EVOH ≤ 6.0%wt + PE-g-MAH tie layers with MAH > 0.1%wt and EVOH:tie layer ratio ≤ 2; Enkase (fluorination); In-mould fluorination; SiOx Plasma coating</u>	<u>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</u>	EVOH > 1% with any other tie layers; PA; PVDC; <u>Plasma Fluorination</u> ; Aluminium, Metallisation; PVOH
	Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants...) and density remains <0.97 g/cm ³	Mineral fillers (CaCO ₃ , talc) not increasing density more than 0,97 g/cm ³	Additives changing material density >1 g/cm ³ ; Flame retardant additives, plasticizers; Bio-/oxo-/photodegradable additive
	Laminating adhesives	Laminating adhesives <u>approved</u> as fully compatible by RecyClass; To be tested if in combination <u>with other barrier material than EVOH</u> Aliphatic polyurethanes < 2.5%	WB acrylics < 2.5%; Laminating adhesives <u>approved</u> as limited compatible by RecyClass; To be tested if in combination with other barrier material than EVOH	Aliphatic polyurethanes (PU) > 2.5 %; Aromatic PU & water based acrylics; Laminating adhesive developed for high thermal applications above boiling and/or for high chemical resistance (to be tested); Any other laminating adhesives (e.g Epoxy).
Attachments	Closure Systems	<u>HDPE; LDPE; LLDPE; MDPE</u>	PP; PET; PETG; PLA; PS (all with a density > 1 g/cm ³); removable aluminium lidding	Non-PO and/or foams with density <1g/cm ³ ; Aluminium; Metal; PVC
	Liners, Seals and Valves	HDPE; LDPE; LLDPE; MDPE; TPO; TPS <= 1 %; <u>Foamed PO</u> ; EVA	PP; TPS; PET, PETG, PLA, PS (all with a density > 1 g/cm ³); Removable silicon with a density > 1 g/cm ³ ;	Non-PO and/or foams with density <1g/cm ³ ; Any other TPE, Aluminium; Metal; Foiled paper; PVC
	Other Components	HDPE; LDPE; LLDPE; MDPE	PP; PET; PETG; PS; PLA all with density >1 g/cm ³ ;	Aluminium; PVC; Glass components; Foams with d < 1 g/cm ³ ;
Decoration**	Inks	Non-bleeding inks compliant with <u>EuPIA Exclusion Policy</u> ; Direct printing for production or expiry date		Bleeding inks; Inks non-compliant with <u>EuPIA Exclusion Policy</u> ; PVC co- and terpolymer binders; any other chlorinated binders; Any other direct printing
	Facestock for Labels	PE	PP, other PO (with density < 1 g/cm ³); PET, PETG, PLA, PS (all with density > 1 g/cm ³); Paper without fibreless; PO-foamed	Non or partially removable labels; Labels that hinder the recognition of the PE; Non PO Labels (d<1 g/cm ³); Paper labels with fibreless; In-Mould-Labels; ALU; Metallised labels; PVC
	Adhesives for labels	<u>Releasable</u> in the recycling process		Non removable in the recycling process
	Sleeves	Sleeves in PE (all with density < 1 g/cm ³); <u>Self-separable plastic and cardboard sleeves under mechanical pressure (sorting test mandatory)</u>	Sleeves in PO (with density < 1 g/cm ³); Sleeves in PET, PETG, PET-C, PLA, PS (all with density >1 g/cm ³); Cardboard sleeves without fiberloss (<u>sorting test</u> mandatory)	Sleeves that hinder PE recognition; in non PO-materials with d <1 g/cm ³ ; Cardboard sleeves with fibreless;; Aluminium; Metallised sleeves; Heavily inked sleeves; PVC
	Other Decorative Tech	Laser marking for production or expiry date	Electroplating on attachments (with density > 1 g/cm ³)	Electroplating on attachments (with density <1 g/cm ³)

Design For Recycling

GUIDELINES for packaging

* Decorative technologies must not hinder the recognition of the underlying PET-polymer, such as size, print, mass colouration and/or barrier. The following size indications can be considered to ensure the recognition of PET:
 - Size of non-PET surfaces on containers > 500 ml: < 70% coverage
 - Size of non-PET surfaces on containers < 500 ml: < 50% coverage

The DfR guidelines for plastic packaging are 100% aligned with...
 For more info, please visit <https://recyclclass.eu/>

RecyClass

CIRCPACK
 by VEOLIA

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible

PE rigid

Coloured

- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility	
Main body	Material*	HDPE; Multilayer PE with HDPE prevalence (LLDPE, LDPE, MDPE), TPO<=10%(full olefinic/aliphatic structure) ; TPS<=5%	PP ≤ 10% ; 5%.TPS.=10%	Multilayers HDPE with PLA; PVC; PS; PET; PETG; 10% < PP ≤ 30% (- 2 classes); PP > 30% (-3 classes) , TPO (rubber, e.g. EPDM)
	Colours	All colours	Black inner layer and dark colours (NIR-detectable)	Non NIR detectable colours
	Size		Items compacted ≤ 5 cm	Items compacted < than 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	EVOH ≤ 6.0%wt + PE-g-MAH tie layers with MAH > 0.1%wt and EVOH:tie layer ratio ≤ 2 ; Enkase (fluorination) ; In-mould fluorination ; SiOx Plasma coating	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; Plasma Fluorination ; Metallisation; PVOH ≤ 1%	EVOH > 1% with any other tie layers; PA; PVDC; Aluminium; PVOH > 1%
	Additives	Unavoidable additives in processing (stabilizers, antioxidants, lubricants, nucleating agents, peroxides) and d = <0,97 g/cm³	Mineral fillers (CaCO ₃ , talc) not increasing density more than 0,97 g/cm³	Additives changing material density >1 g/cm³; Flame retardant additives, plasticizers; Bio-/oxo-/photodegradable additive
Attachments	Laminating adhesives	Polyurethanes and water-based acrylics <3%; Laminating adhesives approved as fully compatible; to be tested if with barrier materials other than EVOH and metallisation	Polyurethanes and water-based acrylics 3-5%; Laminating adhesives approved as fully compatible; to be tested if with a barrier material other than EVOH and metallisation	Polyurethanes and water-based acrylics >5%; laminating adhesive developed for high thermal applications above boiling and/or for high chemical resistance (to be tested); Other adhesives (E.g Epoxy).
	Closure Systems	HDPE; LDPE; LLDPE; MDPE	PP; PET; PETG; PLA; PS (all with a density > 1 g/cm³); Removable aluminium lidding	Non-PO and/or foams with density <1g/cm³; Aluminium; Metal; PVC
	Liners, Seals and Valves	HDPE; LDPE; LLDPE; MDPE; TPO; EVA; TPS <= 1 %; Foamed PO	PP; TPS; PET; PETG; PLA; PS (all with a density > 1 g/cm³); Removable silicon with a density > 1 g/cm³	Non-PO and/or foams with density <1g/cm³; Any other TPE, Aluminium; Metal; Foiled paper; PVC
	Other Components	HDPE; LDPE; LLDPE; MDPE	PP; PET; PETG; PS; PLA all with density >1 g/cm³;	Alu; PVC; Glass components; Non-PO and /or foams with d< 1 g/cm³
Decoration*	Inks	Non-bleeding inks compliant with EuPIA Exclusion Policy ; Inks & lacquer for direct printing representing < 1 wt% of the total packaging, not hindering NIR detection	More than 1wt% direct printing (to be tested)	Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; PVC co- and terpolymer binders; any other chlorinated binders
	Facestock for Labels	PE	Labels in PP, PO (with d < 1 g/cm³); Labels in PET, PETG, PLA, PS (all with d > 1 g/cm³); Labels in Paper without fibreless; PO-foamed labels;	Labels that hinder the recognition of the PE; Non PO labels with d < 1 g/cm³; Paper labels with fibreless during recycling process; Cardboard or paper In-Mould-Labels;Aluminium; Metallised labels; PVC
	In-mould Labels	In-Mould-Labels in PE printed with < 1 wt% of the total packaging; Releasable in the recycling process	Any other In-Mould-Labels in PE	Non-releasable in the recycling process in other materials than PO; Cardboard or paper in In-Mould Labels
	Adhesives for labels	Releasable in the recycling process	Non-releasable approved by RecyClass in combination with film PO labels; Acrylic emulsion ; Hotmelt rubber	Non releasable in the recycling process
	Sleeves	Sleeves in PE (all with density < 1 g/cm³); Self-separable plastic and cardboard sleeves under mechanical pressure (sorting test mandatory)	Sleeves in PO (with density < 1 g/cm³); Sleeves in PET, PETG, PET-C, PLA, PS (all with density >1 g/cm³); Cardboard sleeves without fiberloss (sorting test mandatory)	Sleeves that hinder the recognition of the PE; Sleeves in non PO-materials with d <1 g/cm3 ; Cardboard sleeves with fibreless during recycling process; Alu; Metallised; Heavily inked sleeves; PVC
	Other Decorative Tech	Laser Marking	Electroplating on attachments (with density > 1 g/cm³); Cold transfer and hot stamping technologies not hindering detection	Electroplating on attachments (with density <1 g/cm³)

Design For Recycling

GUIDELINES for packaging

* Polymer resin can be either fossil- or bio-based, virgin or recycled.
 ** Temporary Solution
 *** Guidelines are non-company specifics. Barrier structures compatible with recycling are listed in RecyClass Approval page.

The DfR guidelines for plastic packaging are 100% aligned with...
 For more info, please visit <https://recyclclass.eu/>

RecyClass

CIRCPACK
 by VEOLIA

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid

PE flexible

Transparent

- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility	
Main body	Material*	Oriented and non-oriented LDPE, LLDPE (including PE-plastomers), HDPE; EVA , EBA, EEA, EMA copolymers with acrylate monomers representing <= 5 wt% of the film; EMAA, EAA copolymers & ionomers <= 20%	Multilayer PE/PP with PP ≤ 5%	Multilayer PE/PP with PP > 5%; Any other polymer (e.g. PET, PVC, etc.)
	Colours	Unpigmented; transparent	Light colours; translucent colours	Dark colours; black; carbon black
	Size	Packaging surface > 100 cm²	Packaging surface between 30 and 100 cm²	Packaging surface < 30cm²
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier***	SiOx and AlOx without additional coatings	≤ 5% EVOH (in polyolefin combination film); ≤ 15% PA 6/66 copolymer with melting temperature < 192°C and incorporating ≥ 10% PE-g-MAH tie layers	> 5% EVOH (in polyolefinic combination film); Any other PA; Metallisation; PVOH; PVC, PVDC barrier layer; AlOx coating with PVOH primer ; any other barrier layer; aluminium
	Additives	Additives that do not increase the density higher than 0,97 g/cm ³		Bio-/oxo-/photodegradable additives; foaming agents used as expanding chemical agents; Additives that do increase the density higher than 0,97 g/cm ³ (CaCO ₃ , talc, glass fibers, etc.)
Attachments	Laminating adhesives	Aliphatic polyurethanes ≤ 2.5% Laminating adhesives approved as fully compatible by RecyClass; To be tested if in combination with other barrier than EVOH	Water-based acrylics ≤ 2.5 % ; Laminating adhesives approved as limited compatible by RecyClass; To be tested if in combination with other barrier than EVOH	Aliphatic polyurethanes >2.5% and water based acrylics (to be tested); Aromatic polyurethanes & Water-based acrylics; Laminating adhesive specially developed for high thermal applications above boiling and/or for high chemical resistance (to be tested); Any other laminating adhesives (Epoxy, etc.)
	Closure Systems	LDPE, LLDPE (including PE-plastomers), HDPE	PP	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm ³
	Liners, Seals and Valves	LDPE, LLDPE (including PE-plastomers), HDPE	PP, removable aluminium liddings	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm ³
	Other Components	LDPE, LLDPE (including PE-plastomers), HDPE	PP	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm ³
Decoration	Inks	PU-based inks, Non-bleeding inks compliant with EuPIA Exclusion Policy ; Printed production or expiry date	Printing with coverage < 50 %**	NC-based inks; Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; Printing with coverage > 50 %** PVC co- and terpolymer binders; Any other chlorinated binders
	Feedstock Label Material	PE	PP	Metallized labels, any other; paper labels
	Adhesives for labels	Water soluble or water-releasable at less than 40°C		Adhesives non-soluble in water or non-releasable in water at less than 40°C
	Other Decorative Technologies	Laser marked print; Printed production or expiry date	Laser marking with coverage < 50 %**	

Design For Recycling

GUIDELINES for packaging

* Polymer resin can be either fossil- or bio-based, virgin or recycled.
 ** Temporary Solution
 *** Guidelines are non-company specifics. Barrier structures compatible with recycling are listed in RecyClass Approval page.
 **** NC-binders will be reconsidered based on future findings from RecyClass and SafeCycle project

The DfR guidelines for plastic packaging are 100% aligned with....
 For more info, please visit <https://recyclclass.eu/>

RecyClass

CIRCPACK
 by VEOLIA

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid

PE flexible

Coloured

- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material*	Oriented and non-oriented LDPE, LLDPE (including PE-plastomers), HDPE; EVA, EBA, EEA, EMA copolymers with vinyl acetate and acrylate monomers representing < 5% of the film; EMAA, EAA copolymers & ionomers <= 20%	Multilayer PE/PP <u>with PP ≤ 5%</u>	Multilayer PE/PP with PP > 5%; Any other polymer (e.g. PET, PVC, etc.)
	Colours	Light colours; translucent colours	NIR-detectable dark colours (Sorting test)	Non NIR-detectable dark colours
	Size	<u>Packaging surface > 100 cm²</u>	<u>Packaging surface between 30 and 100 cm²</u>	<u>Packaging surface < 30cm²</u>
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier***	SiOx and AlOx without additional coatings	<u>≤ 5% EVOH (in polyolefinic combination film); Metallisation: PVOH ≤ 1%; ≤ 15% PA 6/66 copolymer with melting temperature < 192°C and incorporating ≥ 10% PE-g-MAH tie layers</u>	> 5% EVOH (in polyolefinic combination film); Any other PA; PVOH > 1%; PVC, PVDC barrier layers; <u>AlOx coating with PVOH primer</u> ; any other barrier layer; aluminium
	Additives	Additives that do not increase the density higher than 0,97 g/cm ³		Bio-/oxo-/photodegradable additives; foaming agents used as expanding chemical agents; Additives that do increase the density higher than 0,97 g/cm ³ (CaCO ₃ , talc, glass fibers, etc.)
	Laminating adhesives	<u>Polyurethanes and water-based acrylics ≤ 3%;</u> <u>Laminating adhesives</u> approved as fully compatible by RecyClass; To be tested if in combination with <u>other barrier than EVOH and metallisation.</u>	<u>Polyurethanes and water-based acrylics 3-5%;</u> Laminating adhesives approved as limited compatible by RecyClass; To be tested if in combination with other barrier material than <u>EVOH and metallisation</u>	Polyurethanes and water-based acrylics >5%; Laminating adhesive specially developed for high thermal applications above boiling and/or for high chemical resistance (to be tested); Any other laminating adhesives (Epoxy, etc.)
Attachments	Closure Systems	LDPE, LLDPE (including PE-plastomers), HDPE	PP	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm ³
	Liners, Seals and Valves	LDPE, LLDPE (including PE-plastomers), HDPE	PP, removable aluminium liddings	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm ³
	Other Attachments	LDPE, LLDPE (including PE-plastomers), HDPE	PP	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm ³
Decoration	Inks	PU-based inks (with no NC); Non-bleeding inks compliant with <u>EuPIA Exclusion Policy</u> ; Inks & Varnish <5%	<= 0.8% of NC-binders**** Inks & Varnish 5-7%	> 0.8% of NC-binders; Inks & Varnish >7%; Bleeding inks; Inks non-compliant with EuPIA Exclusion Policy; PVC co- and terpolymer binders; Any other chlorinated binders
	Labels	PE	PP	Metallized labels, any other; paper labels
	Adhesives for labels	Water soluble or water-releasable at less than 40°C		Adhesives non-soluble in water or non-releasable in water at less than 40°C
	Other Decorative Technologies	Laser marking with coverage <50% **	Laser marking with coverage > 50%**	

Design For Recycling

GUIDELINES for packaging

* Polymer resin can be either fossil- or bio-based, virgin or recycled. EPS commercial packaging does not refer to other existing DfR Guidelines (i.e. EPS white goods and EPS fish boxes). XPS and EPS household packaging are not recycled into the PS stream. To recycle them, it is necessary to develop a separate stream.

** Decorative technologies must not hinder the recognition of the underlying PE-polymer. Features as size, print, mass colouration and/or barrier might require to perform a Sorting Evaluation Protocol. The following size indications can be considered to ensure the recognition of PE:

- Size of non-PE detectable surfaces on containers > 500 ml: < 70% coverage
- Size of non-PE detectable surfaces on containers < 500 ml: < 50% coverage

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid
- PE flexible

PS

Natural&white

- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material*	PS		PS foamed < 1 g/cm ³ ; multilayers (PET, PETG, PVC, PLA, HDPE, PP...)
	Colours	Natural; white		Any other colour
	Size		Items compacted ≤ 5 cm	Items (compactd) ≤ 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	EVOH ≤ 5.0 wt% + PE-g-MAH tie layers and EVOH:Tie layers ratio ≤ 1	EVOH > 5.0 wt% + PE-g-MAH tie layers and EVOH:Tie layers ratio ≤ 1	PA; PVdC
	Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants...) and in formulation (SBS copolymer) with density that remains between 1 and 1.07 g/cm ³	Mineral fillers (CaCO ₃ , talc) not increasing density > 1.07 g/cm ³	Additives increasing density > 1.07 g/cm ³ ; Bio/oxo/photodegradable additives
Attachments	Colours	Natural; White	Light colours	Black Inner layer, Black, Carbon Black, Other dark colours
	Closure Systems	PS	Removable PP and/or PE	PET; PETG; PVC; PLA; Paper; Any material with d >1 g/cm ³ ; Non detaching or welded closures; Aluminium; metal
	Liners, Seals and Valves	PS	PP; PE; EVA; TPE (non welded and with density <1 g/cm ³)	PET; PETG; PVC; PLA; Any material with d >1 g/cm ³ ; Metal; metal foil; silicone
	Lids	PS	Removable aluminium lidding ; Removable PP and/or PE; Removable PET	PVC; Non removable alu lidding; Paper; non-removable PET. Multilayer PET/paper or PET/PS; Any material with density >1 g/cm ³
	Other Components	PS	Removable PP and/or PE	PET, PETG, PVC, PLA, metal, metal foil, paper; Any other material with density >1 g/cm ³
	Inks	Non-bleeding inks compliant with EuPIA Exclusion Policy. Direct printing for production or expiry date		Inks that bleed; Inks non-compliant with EuPIA Exclusion Policy ; PVC binders; Any other chlorinated binder; Any other direct printing
Decoration**	Facestock Label Material	Removable labels in PS	PE, PO (with density <1 g/cm ³) not hampering the NIR detection (sorting test mandatory)	Non removable or partially removable labels; Labels that hinder the recognition of the PS; PET, PETG, PVC, PLA; Paper label; In-Mould-Labels; Metallised materials; Aluminium
	Adhesives for labels*	Releasable labels in the recycling process		Not-releasable in the recycling process
	Sleeves	Sleeves in PS; Self-separable plastic and cardboard sleeves under mechanical pressure (sorting test mandatory)	PE, PO (with density <1 g/cm ³) not hampering the NIR detection (sorting test mandatory)	Sleeves that hinder PS recognition; Sleeves in non PO materials with density <1 g/cm ³ ; PET, PETG, PVC, PLA; Cardboard sleeves; Metallised materials; Heavily inked sleeves; Aluminium
	Other Decorative Techs	Laser marked; Production or expiry date		

Design For Recycling

GUIDELINES for packaging

* Polymer resin can be either fossil- or bio-based, virgin or recycled. EPS commercial packaging should refer to other existing DfR Guidelines (i.e. EPS white goods and EPS fish boxes). XPS and EPS household packaging are not recycled into the PS stream. To recycle them, it is necessary to develop a separate stream.

** Decorative technologies must not hinder the recognition of the underlying PE-polymer. Features as size, print, mass colouration and/or barrier might require to perform a Sorting Evaluation Protocol. The following size indications can be considered to ensure the recognition of PE:

- Size of non-PE detectable surfaces on containers > 500 ml: < 70% coverage
- Size of non-PE detectable surfaces on containers < 500 ml: < 50% coverage

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid
- PE flexible

PS

Coloured

- Paper & cardboard
- Beverage carton
- Glass
- Steel
- Aluminium



		Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main body	Material	PS		PS foamed < 1 g/cm ³ ; multilayers (PET, PETG, PVC, PLA, HDPE, PP...)
	Colours	Light colours	Dark colours (NIR detectable)	Non NIR-detectable colours
	Size		Items compacted ≤ 5 cm	Items (compactd) ≤ 2 cm
	Product residues	A if the index Easy-to-empty is < 5%; B if the index is < 10%	C if the index Easy-to-empty is < 15%	D if index <20%; E < if index 25%; F if index > 25%
	Barrier	EVOH ≤ 5.0 wt% + PE-g-MAH tie layers and EVOH:Tie layers ratio ≤ 1	EVOH > 5.0 wt% + PE-g-MAH tie layers and EVOH:Tie layers ratio ≤ 1	PA; PVdC
	Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants...) and in formulation (SBS copolymer) with density that remains between 1 and 1.07 g/cm ³	Mineral fillers (CaCO ₃ , talc) not increasing density > 1.07 g/cm ³	Additives increasing density > 1.07 g/cm ³ ; Bio/oxo/photodegradable additives
Attachments	Closure Systems	PS	Removable PP and/or PE; paper without fibre loss	PET; PETG; PVC; PLA; Paper; Any material with d >1 g/cm ³ ; Non detaching or welded closures; Aluminium; metal
	Liners, Seals and Valves	PS	PP; PE; EVA; TPE (non welded and with density <1 g/cm ³)	PET; PETG; PVC; PLA; Any material with d >1 g/cm ³ ; Metal; metal foil; silicone
	Lids	PS	Removable aluminium lidding ; Removable PP and/or PE ; Removable PET; Paper without fibre loss	PVC; Non removable alu lidding; Paper; PET. Multilayer PET/paper or PET/PS; Any material with density >1 g/cm ³
	Other Components	PS	Removable PP and/or PE; paper without fiberloss	PET, PETG, PVC, PLA, metal, metal foil, paper; Any other material with density >1 g/cm ³
Decoration	Inks	Non-bleeding inks compliant with EuPIA Exclusion Policy; Inks & lacquers for direct printing representing < 1 wt% of the total packaging, not hindering NIR detection	More than 1 wt% direct printing (to be tested)	Bleeding inks; Inks non compliant with EuPIA Exclusion Policy; PVC co-and terpolymer binders; any other chlorinated binders
	Facestock Label Material	PS	Labels in PP, PE (with density < 1 g/cm ³); Label in paper without fiberloss	Labels that hinder the recognition of the PS; PET; PETG; PVC; PLA; Paper with fiberloss; In-Mould-Labels; Metallised materials; Aluminium
	Adhesives for labels*	Releasable in the recycling process		Non-removable in the recycling process
	Sleeves	PS; Self-separable plastic and cardboard sleeves under mechanical pressure (sorting test mandatory)	Sleeves in PE, PO (with density <1 g/cm ³) not hampering the NIR detection (sorting test mandatory)	Sleeves that hinder PS recognition; Sleeves in non PO materials with d <1 g/cm ³ ; PET, PETG, PVC, PLA; Cardboard sleeves; Metallised materials; Heavily inked sleeves; Alu
	Direct Printing	Laser marking		

Design For Recycling

GUIDELINES for packaging

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid
- PE flexible
- PS

Paper & cardboard

- Beverage carton
- Glass
- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
General bale quality requirements (according to DIN643)	Natural fibre-based paper and board suitable for recycling Normal component of paper: filling material, starch, coating colourants, binding materials and additives compatible with recycling process	Unwanted material (outthrows) max 1.5% Non-paper components, paper and board not according to grade definition, 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	Wood-based fibres; Other fibre sources leading to similar pulp quality as wood-based fibres	Other fibre sources leading to different pulp quality as wood-based fibres (bamboo, grass, hemp, etc.) Compostable separable component (such as cellulosic-film window)	Non-separable plastic components & aluminium during reprocessing
Colours		Paper suitable for de-inking	Paper not suitable for de-inking
Barrier (coating, lamination,...)	Without coating or lamination Adhesive lamination with water-soluble adhesives / water soluble coatings	One-sided plastic coating/laminate, if fibre content is > the country specific threshold, Metallisation (70%) of the surface Hot stamping or cold transfert Adhesive lamination inside of packaging (PET, mPET, PET/PE), Wax dispersion and Coating	Two-sided plastic coating/laminate, if fibre content < country specific threshold, Polymers with low shear strenght that break down in pulper PVC coating Silicone or wax coating, Peelable solutions that do not separate during collection and sorting
Labels and Adhesives	Hotmelts with a softening point > 68°C and layer thickness of > 120µm, Pressure sensitive hot melt and pressure sensitive UV-curable acrylic adhesive (pulping test), Waterbased adhesives	Water soluble adhesives	Insoluble adhesives; heavy foils; Latex/Hotmelt; Hotmelts with a softening point < 68°C
Fillers, Additives & Agents	Mineral fillers (talc, kaolin, TiO2, starch, calcium carbonate); Wet strength agents without negative impact on fibre recovery and recycling Dry strength agents (starch, polyvinylamine and GPAM)	PAE (wet strength agent)	Wet strength agents with negative or unproven impact on fibre recovery and recycling; Siliconizing agents
Inks & decorations	Non toxic following the EuPIA Guidelines Water-based inks and varnishes Liquid & dry toners Solvent-based inks and varnishes	Metallic decoration (e.g. hot/cold foil transfer) Metallisation (pulping test)	Inks that bleed; toxic or hazardous inks (Inks that are on the EuPIA exclusion list); mineral-oil based colours; UV curing inks and varnished; plasticised inks. PP/PET metalized laminates; PET metalized films

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

Design For Recycling

GUIDELINES for packaging

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid
- PE flexible
- PS
- Paper & cardboard

Beverage carton

- Glass
- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main Material: Recyclable content	A when >95% B when >90%	C when >70%	D when >50% F (Disqualified) when <50% fibres
Colours	NIR-detectable		Non-NIR-detectable colours (e.g. carbon black)
Liners, Barriers & coatings	<ul style="list-style-type: none"> - PE coating - Clay / pigment coating - Aluminium film - Polyamide 6 (PA 6) coextruded with PE at <20% of weight of the liner and density <1.0: (At least one surrounding layer must contain maleic anhydride-grafted PE as tie layer specified for PA/PE coextrusion in a ratio of ≥ 0.5 g per g PA) - EVOH $\leq 1\%$ with any tie layer - EVOH $\leq 6.0\text{wt}\%$ + PE-g-MAH tie layers with MAH $\geq 0.1\text{wt}\%$ and EVOH:tie layers ratio ≤ 2 - Enkase (fluorination) - In-Mould fluorination - SiOx at <5wt% in the foil component - AlOx at <5wt% in the foil component - Metalisation <5wt% in the foil component 	<ul style="list-style-type: none"> - EVOH > 1% with any other tie layer - Plasma fluorination - PVOH - SiOx at >5wt% in the foil component - AlOx at >5wt% in the foil component - Metalisation >5wt% in the foil component 	<ul style="list-style-type: none"> PVC/PvdC Oxo-degradable plastics Wax coating Biodegradable polymers PET Any other barrier solution
Closure system	<ul style="list-style-type: none"> - Temper evident seal (which will be 100% removed by normal usage) - PE or PP - Metal or steel 	- Non PO-plastics (all with density > 1g/cm ³)	<ul style="list-style-type: none"> - PVC/PvdC - Silicone - Biodegradable polymers - Any other polymer with Density <1 g/cm³
Adhesives	<ul style="list-style-type: none"> Water soluble adhesive Hot melt adhesive (with softening temperatures >68°C) 		<ul style="list-style-type: none"> - Insoluble dispersing adhesives, - Latex, hotmelt and wet-strength adhesives
Additives (wet strength resins)	GPAM (glyoxylated polyacrylamide)	<ul style="list-style-type: none"> - PAE (PolyAmide-Epichlorohydrin) - Urea/Formaldehyde 	Others
Additives (wet end sizing)	<ul style="list-style-type: none"> - AKD (Alkylketene dimers) - ASA (Alkenylsuccinic anhydride) - Rosin 		Others
Fillers, Additives & Agents			
Inks & Printing	<ul style="list-style-type: none"> Offset print - oil-based ink (vegetable) Flexo - SB / Wb Gravure - SB / Wb 	<ul style="list-style-type: none"> Non toxic (not listed in EUPIA exclusion policy) Metallized decoration Offset print - oil-based ink (mineral) 	Inks that bleed; toxic or hazardous inks (Inks that are on the EuPIA exclusion list), metal inks
Other Components	Paper straw		

Design For Recycling

GUIDELINES for packaging

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid
- PE flexible
- PS
- Paper & cardboard
- Beverage carton

Glass

- Steel
- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main Material	Soda-lime glass		Non soda lime glass or infusible material (borosilicate, ceramics, stoneware, porcelain...)
Colours	Flint (transparent clear) Transparent green Transparent dead leaf Transparent amber	Other transparent colours (red, purple, blue...) Other dark colours that do not affect optical sorting	Opaque colours
Closure Systems	Steel Aluminium Plastic (except PVC/PVDC) Cork stopper	Other ferromagnetic or reactive to Eddy Current metals	Swing-top closure with ceramic or metal Non ferromagnetic or non reactive to Eddy Current metals (e.g. stainless steel)
Labels and Adhesives	Releasable paper Releasable plastic (except PVC/PVDC)	Non releasable label (except PVC/PVDC) that covers less than 40% of the packaging surface	Non releasable label or sleeve that covers more than 40% of the packaging surface PVC/PVDC
Inks	Inks compliant with EuPIA Exclusion Policy		Inks non-compliant with EuPIA Exclusion Policy
Direct Printing and surface treatment	Transparent coatings and surface treatments including etching Laser engraving	Opaque inks, coatings or metallization that cover less than 40% of the packaging surface	Opaque inks, coatings or metallization that cover more than 40% of the packaging surface
Other Components	Steel Aluminium Plastic (except PVC/PVDC) Cork stopper	Magnets Other ferromagnetic or reactive to Eddy Current metals Glued components	RFID tag or any electronic features PVC/PVDC Non soda-lime glass (CSP, HR...) Non ferromagnetic or non reactive to Eddy Current metals (e.g. stainless steel) Metal components that cannot be separated by overband or Eddy Current by design (e.g. sealing rings, springs, beads...)

Design For Recycling

GUIDELINES for packaging

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid
- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass

Steel

- Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main Material	Steel	Steel mixed with other metals <5%wt Plastic <15%wt Tin content between 0wt% and 0.2% of all metal elements 0 class deduction, Tin content between 0.2wt% and 1% of all metal elements 1 class deduction, and Tin content over 1% of all metal elements 2 class deductions	Other metals >5%wt (e.g. stainless steel, aluminium, copper, lead...) Plastic >15%wt
Size	Size > 45mm	Size <45mm	Size <20mm
Closure Systems	Steel	Plastic closure Non-steel metal	
Labels and Adhesives	Paper labels	Plastic label	
Inks			Toxic inks (EuPIA list)
Direct Printing	Laser engraving and direct printing		
Other Components			Product residues not allowed in the collection system Magnetic components

Design For Recycling

GUIDELINES for packaging

Material:

- PET bottle
- PET thermoform
- PP rigid
- PP flexible
- PE rigid
- PE flexible
- PS
- Paper & cardboard
- Beverage carton
- Glass
- Steel

Aluminium



	Yes - Full compatibility	Conditional - Limited compatibility	No - Low (or no) compatibility
Main Material	Aluminium	Aluminium with other metals <5%wt Plastic <20%wt	Other metals >5%wt (e.g. steel, stainless steel, copper, lead...) Plastic > 20%wt
Size	Size > 45mm	Size <45mm	Size <20mm
Closure Systems	Aluminium	Plastic Ferrous Metals	
Labels and Adhesives	Paper Labels	Plastic Label	
Inks			Toxic inks (EuPIA list)
Direct Printing	Laser engraving and direct printing		
Other Components			Residues that limit sorting Product residues not allowed in the collection system Magnetic components

Our Services

It's all about circular packaging

“WE ENSURE THE RECYCLABILITY OF YOUR PACKAGING”



1 TEST & ADVICE

Test, understand and improve recyclability of your packaging



2 RECYCLABILITY CERTIFICATION

Assess & certify recyclability of your packaging



3 COUNTRY REPORTS

Explore the world of recycling and EPR in 69 countries!



4 DESIGN GUIDELINES

Eco-design recommendations to optimise recyclability



5 MASTERCLASS RECYCLING

Online-training on recycling of household packaging



6 RECYCLING INTELLIGENCE

Customised in-depth studies on strategic recycling topics

Expertise & certification on circular packaging

*Supporting brand owners, packaging companies and
retailers in their quest for circular packaging*

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