

Design For Recycling

GUIDELINES for packaging

CIRCPACK

by  **VEOLIA**

Design For Recycling

GUIDELINES for packaging

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.

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GUIDELINES for packaging

Material:

PET-bottles

Clear

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



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing	
Main body	Main Material Bottle	PET	PLA; PVC; PS; PETG	
	Material composition	A when PET content is > 95%; B when PET content is > 90%	C when PET content is > 70%	D when PET content is > 50%; E when PET content is > 30%; F when PET content is < 30%
	Colours	Transparent clear, transparent light blue		Opaque; Other transparent colours; Fluorescence; Metallic
	Size			< 4 cm (compacted); > 5 liter content
	Product residues Easy to empty index	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	D if the index is < 20%; E < if the index is 25%; F if the 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 or tie layers; Monolayer PA blend; EVOH
Attachments	Additives	UV stabilisers; Acetaldehyde (AA) blockers; Optical brighteners; Oxygen scavengers	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
Decoration	Liners, Seals and Valves	PE; PE + EVA; PP; foamed PET (all with a density < 1 g/cm ³)	Silicone with density <0.95g/cm ³	Materials with density >1 g/cm ³ (e.g. PVC, silicone, metals)
	Labels	Labels in PE; PP; OPP; EPS; foamed PET (all with density <1 g/cm ³), with a size that does not hinder* the recognition of the underlying PET-polymer <i>* indication label size of bottles > 500 ml: < 70% coverage</i> <i>* indication label size of bottles ≤ 500 ml: < 50% coverage</i>	Lightly metallized labels; Paper labels without fiberlosses	Labels which hinder the recognition of the underlying PET-polymer (e.g. too large, metalised, heavily inked); Labels with density >1 g/cm ³ (e.g. PVC; PS; PET; PETG; PLA); Metallized labels; Non-detaching or welded labels; Paper labels with fibreloss; Foamed PETG labels (even with density <1 g/cm ³); PET labels with washable inks
	Sleeves	Sleeves in PE; PP; OPP; EPS; foamed PET; LDPET (all with density <1 g/cm ³), with a size that does not hinder* the recognition of the underlying PET-polymer <i>* Indication sleevesize of bottles > 500 ml: < 70% coverage</i> <i>* Indication sleevesize of bottles ≤ 500 ml: < 50% coverage</i>	Full sleeves translucent for IR detection in PE; PP; OPP; EPS; foamed PET; LDPET; all with density <1 g/cm ³ <i>INTERIM: Twin-perforated sleeves for household and personal care conform guidelines by EPBP</i>	Sleeves which hinder the recognition of the underlying PET-polymer (e.g. too large, metalised, heavily inked); Sleeves with density >1 g/cm ³ (e.g. PVC; PS; PET; PETG); Foamed PETG sleeves (even with density <1 g/cm ³); PET sleeves with washable inks
	Tamper Evidence Wrap	PE; PP; OPP; EPS, Foamed PET (all with density <1 g/cm ³)		Materials with density >1 g/cm ³ (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
	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	Components which are separated by grinding and float/sink - all with density <1 g/cm ³ ; Unpigmented PET		Materials with density >1 g/cm ³ (e.g. metal, RFID tags); Non detaching or welded components; Coloured PET

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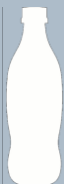
GUIDELINES for packaging

Material:

PET-bottles

Coloured

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



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing	
Main body	Main Material Bottle	PET	PLA; PVC; PS; PETG	
	Material composition	A when PET content is > 95%; B when PET content is > 90%	C when PET content is > 70%	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 Easy to empty index	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	D if index is < 20%; E < if index is 25%; F if index is > 25%
Attachments	Barrier	SiOx coating; Carbon plasma-coating; PTN alloy; PA-MXD6 multilayer with <6wt% PA-MXD6 and no tie layers;	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
	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 and Valves	PE; PE + EVA; PP; foamed PET (all with a density < 1 g/cm ³)	Silicone with density <0.95g/cm ³	Materials with density >1 g/cm ³ (e.g. PVC, silicone, metals)
	Inks	Non-toxic (according to EUPIA guidelines)		Inks that bleed; Toxic or hazardous inks
	Labels	Labels in PE; PP; OPP; EPS; foamed PET (all with density <1 g/cm ³), with a size that does not hinder* the recognition of the underlying 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 underlying PET-polymer (e.g. too large, metalised, heavily inked); Labels with density >1 g/cm ³ (e.g.PVC; PS; PET; PETG; PLA); Metallized labels; Non-detaching or welded labels; Paper labels with fibreloss; Foamed PETG labels (even with density <1 g/cm ³); PET labels with washable inks
	Adhesives for labels	Alkali/water soluble and alkali/water releasable adhesives 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
	Sleeves	Sleeves in PE; PP; OPP; EPS; foamed PET; LDPET (all with density <1 g/cm ³), with a size that does not hinder* the recognition of the underlying 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/cm ³ INTERIM: Twin-perforated sleeves for household personal care conform guidelines by EPBP	Sleeves which hinder the recognition of the underlying PET-polymer (e.g. too large, metalised, heavily inked); Sleeves with density >1 g/cm ³ (e.g.PVC; PS; PET; PETG); Foamed PETG sleeves (even with density <1 g/cm ³); PET sleeves with washable inks
	Tamper Evidence Wrap	PE; PP; OPP; EPS, Foamed PET (all with density <1 g/cm ³)		Materials with density >1 g/cm ³ (e.g metal; PVC; PS; PETG); Metallised materials; Foamed PETG (even with density <1 g/cm ³); PET with washable 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/cm ³ ; PET		Materials with density >1 g/cm ³ (e.g. metal, RFID tags); Non-detaching or welded components	

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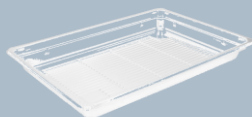
Material:

- PET-bottles

PET-trays

Clear

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



		Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
Main body	Tray	PET		Any PET based multilayer material including PET/PE; PLA; PVC; PS; PETG; C-PET; PET-GAG; Expanded PET
	Material composition	A when PET content is > 95%; B when PET content is > 90%	C when PET content is > 70%	D when PET content is > 50%; E when PET content is > 30%; F when PET content is < 30%
	Colours	Transparent clear; Transparent light blue		Opaque; Other transparent colours; Metallic; Opaque
	Size		Items compacted < 5 cm	Items compacted < than 2 cm
	Product residues <small>Easy to empty index</small>	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	D if index is < 20%; E < if index is 25%; F if index is > 25%
	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 stabilisers; AA blockers; optical brighteners; antiblocking masterbatch (> 3%); anti-stat agents; antiblocking agents; anti-fogging agents (on coating area)	Bio/Oxo/Photodegradable additives; Nanocomposites
Attachments	Closure Systems: Lidding films	Unprinted PET; Floating plastics with density < 1 g/cm ³ 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
	Inks	Non toxic following the EuPIA Guidelines		Inks that bleed; Toxic or hazardous inks
Decoration	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 * Indication label size of trays: < 30% coverage	BPA-free paper labels without fibreloss during recycling process	Plastic labels with density > 1 g/cm ³ (also in more heavily printed and glued area); Paper labels with fibreloss during recycling process; Paper labels containing BPA; Non floating paper labels
	Adhesive for labels	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		Any other adhesive
	Direct Printing	Laser marked	Production or expiry 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 g/cm ³)	Paper & cardboard not loosing fibres	PVC / PS / EPS / PU / PA; PC/PMMA; Thermoset plastics; Metals; Paper & cardboard loosing fibres

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Material:

- PET-bottles
- PET-trays
- PP rigids Natural
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel
- Aluminium



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing	
Main body	Main Material	PP	Multilayers with PLA; PVC; PS; PET; PETG	
	Material composition	A when PP content is > 95%; B when PP content is > 90%	C when PP content is > 70%	D when PP content is > 50%; E when PP content is > 30%; F when PP content is <30%
	Colours	Natural (clear)	Light colours	Black Inner layer; Black; Carbon Black; Other dark colours
	Size		Items compacted < 5 cm	Items compacted < than 2 cm;
	Product residues <small>Easy to empty index</small>	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	D if the index is < 20%; E < if the index is 25%; F if the index is > 25%
	Barrier	≤ 6% EVOH + PP-g-MAH tie layers	> 6% EVOH + PP-g-MAH tie layers	EVOH 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/cm ³	Mineral fillers (CaCO ₃ , talc) not increasing density more than 0,97 g/cm ³	Additives changing the material density > 1 g/cm ³ Flame-retardant additives, plasticizers Bio-/oxo-/photodegradable additive
	Closure Systems	PP	HDPE; LDPE; LLDPE; MDPE; PET; PETG; PS; PLA (all with a density >1g/cm ³)	Non-PO and/or foams with density <1g/cm ³ ; Aluminium; Metal; PVC
	Liners, Seals and Valves	PP; TPE-PP	HDPE; LDPE; LLDPE; MDPE; TPE-PE; PET, PETG, PS, PLA (all with a density >1g/cm ³); Removable aluminium fasteners 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
	Inks	Non toxic following the EuPIA Guidelines		Inks that bleed; Toxic or hazardous inks
Attachments	Sleeves	Sleeves in PP (with density <1 g/cm ³)*	Sleeves that hinder the recognition of the PP; Sleeves in non PO-materials with density <1 g/cm ³ ; Aluminium; Metalised Sleeves; Heavily inked sleeves; PVC	
	Labels	Labels in PP (all with density <1 g/cm ³)*	Labels that hinder the recognition of the PP; Labels in non PO-materials with density < 1 g/cm ³ ; Paper labels with fibreloss during recycling process; Aluminium; Metalised labels; PVC	
	Adhesives for labels	Water soluble or water releasable adhesive (@ less than 40°C)	Pressure sensitive labels	Non water soluble or water releasable adhesives
Decoration*	Direct Printing	Laser marked; Production or best-before date		Any other direct printing
	Other Components	PP	PE with density <1 g/cm ³ ; PET; PETG; PS; PLA all with density >1 g/cm ³	Aluminium; PVC; Glass components; Non-PO and /or foams with density < 1 g/cm ³

Design For Recycling

GUIDELINES for packaging

Material:

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



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing	
Main body	Main Material	PP		
	Material composition	A when PP content is > 95%; B when PP content is > 90%	C when PP content is > 70%	Multilayers with PLA; PVC; PS; PET; PETG D when PP content is > 50%; E when PP content is > 30%; F when PP content is <30%
	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
	Colours	All colours	Black inner layer and dark colours (NIR-detectable)	Non NIR detectable colours
	Product residues Easy to empty index	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	D if the index is < 20%; E < if the index is 25%; F if the index is > 25%
	Barrier	≤ 6% EVOH + PP-g-MAH tie layers	> 6% EVOH + PP-g-MAH tie layers	EVOH 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/cm ³	Mineral fillers (CaCO ₃ , talc) not increasing density more than 0,97 g/cm ³	Additives changing the material density > 1 g/cm ³ Flame-retardant additives, plasticizers Bio-/oxo-/photodegradable additives
	Closure Systems	PP	- HDPE; LDPE; LLDPE; MDPE; - PET; PETG; PS; PLA (all with a density >1g/cm ³)	Non-PO and/or foams with density <1g/cm ³ ; Aluminium; Metal; PVC
	Liners, Seals and Valves	PP; TPE-PP	HDPE; LDPE; LLDPE; MDPE; TPE-PE; PET, PETG, PS, PLA (all with a density >1g/cm ³); Removable aluminium fasteners 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
Attachments	Inks	Non toxic following the EuPIA Guidelines	Inks that bleed; Toxic or hazardous inks	
	Sleeves	Sleeves in PP (with density <1 g/cm ³)*	Sleeves that hinder the recognition of the PP; Sleeves in non PO-materials with density <1 g/cm ³ ; Aluminium; Metalised Sleeves; Heavily inked sleeves; PVC	
	Labels	Labels in PP (all with density <1 g/cm ³)*	Labels that hinder the recognition of the PP; Labels in non PO-materials with density < 1 g/cm ³ ; Paper labels with fibreloss during recycling process; Aluminium; Metalised labels; PVC	
Decoration	Adhesives for labels	Water soluble or water releasable adhesive (@ less than 40°C)	Non water soluble or water releasable adhesives	
	Direct Printing	Laser marked; Production or best-before date		
	Other Components	PP	Aluminium; PVC; Glass components; Non-PO and /or foams with density < 1 g/cm ³	

Design For Recycling

GUIDELINES for packaging

Material:

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



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
Main body	Main Material	PP	Multilayer PP/PE
	Material composition	A when PP content is > 95%; B when PP content is > 90%	C when PP content is > 70%
	Colours	Unpigmented; transparent	Light colours; translucent 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)
	Product residues Easy to empty index	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%
Decoration** Attachments	Barrier	Barrier in the polymer matrix; SiOx and AlOx without additional coatings	EVOH (in polyolefin combination film); metallized layers without coatings
	Additives	Additives that do not increase the density higher than 0,97 g/cm ³	
	Closure Systems	PP	PE
	Liners, Seals and Valves	PP	PE, removable aluminium liddings
	Labels	PP	PE, paper labels without fiberloss
	Adhesives	Water soluble or water-releasable at less than 60°C	
	Inks	No inks	Non-toxic (according to EUPIA guidelines)
	Direct Printing	Laser marked print; Printed production or expiry date	Printing covering < 50%*
	Other Attachments	PP	PE
			D when PP content is > 50%; E when PP content is > 30%; F when PP content is < 30%
			Dark colours; black; carbon black
			< 20 x 20 mm
			D if index is < 20%; E < if index is 25%; F if index is > 25%
			Barrier layer PVC, PVDC, PA; any other barrier layer; foaming agents used as expandant chemical agents; aluminium
			Bio-/oxo-/photodegradable additives
			Additives that do increase the density higher than 0,97 g/cm ³ (CaCO ₃ , talc, glass fibers, etc.)
			Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm ³
			Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm ³
			Metallized labels, any other; paper labels with fibreloss
			Adhesives non-soluble in water or non-releasable in water at less than 60°C
			Inks that bleed; Toxic or hazardous inks
			Printing covering > 50%*
			Metal, aluminium, PVC, PET, PETG, PS, PLA, paper, foams with density < 1 g/cm ³

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PE rigids Coloured
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel
- Aluminium

PP flexibles



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
Main body	Main Material	PP	Multilayer PP/PE
	Material composition	A when PP content is > 95%; B when PP content is > 90%	C when PP content is > 70%
	Colours	Light colours; translucent colours	NIR-detectable colours (Sorting test)
	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)
	Product residues Easy to empty index	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%
Attachment	Barrier	Barrier in the polymer matrix; SiOx and AlOx without additional coatings	EVOH (in polyolefin combination film); metallized layers without coating
	Additives	Additives that do not increase the density higher than 0,97 g/cm ³	
	Closure Systems	PP	PE
	Liners, Seals and Valves	PP	PE, removable aluminium lidding
	Labels	PP	PE, paper labels without fiberloss
Decoration**	Adhesives	Water soluble or water-releasable at less than 60°C	
	Inks	Non-toxic (according to EUPIA guidelines)	
	Direct Printing	Laser marked print; Printed production or expiry date; printing covering < 50%*	Printing covering > 50%*
	Other Attachments	PP	PE

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles

PE rigids

Natural

- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel
- Aluminium



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing	
Main body	Main Material	HDPE; Multilayer PE with HDPE prevalence (LLDPE, LDPE, MDPE)	Multilayers HDPE with PLA; PVC; PS; PET; PETG	
	Material composition	A when PE content is > 95%; B when PE content is > 90%	C when PE content is > 70%	D when PE content is > 50%; E when PE content is > 30%; F when PE content is <30%
	Colours	Natural (clear)	Light colours	Black Inner layer; Black; Carbon Black; Other dark colours
	Size		Items compacted < 5 cm	Items (compacted) < 2 cm
	Product residues Easy to empty index	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	D if the index is < 20%; E < if the index is 25%; F if the index is > 25%
	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/cm ³	Mineral fillers (CaCO ₃ , talc) not increasing density more than 0,97 g/cm ³	Additives changing the material density > 1 g/cm ³ ; Flame-retardant additives, plasticizers; Bio-/oxo-/photodegradable additives	
Attachments	Closure Systems	HDPE; LDPE; LLDPE; MDPE	PP; PET; PETG; PS; PLA (all with a density >1g/cm ³)	Non-PO and/or foams with density <1g/cm ³ ; 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/cm ³). Removable aluminium lidding; Removable silicon with density > 1 g/cm ³	Non-PO and/or foams with density <1g/cm ³ ; Any other TPE, Aluminium; Metal; Foiled paper; PVC
Decoration*	Label materials (PSL, wet-glue labels, wrap-around labels, IML)	Labels in HDPE, LDPE, LLDPE, MDPE (all with density <1 g/cm ³)	Labels in PP, PO (with density < 1 g/cm ³); Labels in PET, PETG, PLA, PS (all with density > 1 g/cm ³); Labels in Paper without fibreless; PO-foamed labels	Labels that hinder the recognition of the PE; Labels in non PO-materials with density < 1 g/cm ³ ; Paper labels with fibreless during recycling process; In-Mould-Labels; Aluminium; Metallised labels; PVC
	Adhesives for labels	Water soluble adhesive (@ less than 40°C); Water releasable adhesive (@ less than 40°C)		Non-water soluble adhesive (@ less than 40°C); Non-water releasable adhesive (@ less than 40°C)
	Sleeves	Sleeves in PE (all with density <1 g/cm ³); Self-separable plastic and cardboard sleeves under mechanical pressure (sorting test mandatory)	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 (sorting test mandatory)	Sleeves that hinder the recognition of the PE; Sleeves in non PO-materials with density <1 g/cm ³ ; Cardboard sleeves without fiberloss (sorting test mandatory); Aluminium; Metallised sleeves; Heavily inked sleeves; PVC
	Inks	Non toxic following the EuPIA Guidelines		Inks that bleed; Toxic or hazardous inks; PVC binders
	Direct Printing	Laser marked; Production or best-before date		Any other direct printing
Other Components (and decorative technologies)	HDPE, LDPE, LLDPE, MDPE	PP; PET; PETG; PS; PLA all with density >1 g/cm ³ ; Electroplating on attachments (with density > 1 g/cm ³)	Aluminium; PVC; Glass components; Foams with density < 1 g/cm ³ ; Electroplating on attachments (with density > 1 g/cm ³)	

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles

PE rigids

Coloured

- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel
- Aluminium



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
Main body	Main Material	HDPE; Multilayer PE with HDPE prevalence (LLDPE, LDPE, MDPE)	Multilayer HDPE with PLA; PVC; PS; PET; PETG
	Material composition	A when PE content is > 95%; B when PE content is > 90%	C when PE content is > 70%
	Colours	All colours	Black inner layer and dark colours (NIR-detectable)
	Size		Items compacted < 5 cm
	Product residues <i>Easy to empty index</i>	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%
Attachments	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;
	Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants, nucleating agents, peroxides) and density remains < 0,97 g/cm ³	Mineral fillers (CaCO ₃ , talc) not increasing density more than 0,97 g/cm ³
	Closure Systems	HDPE; LDPE; LLDPE; MDPE	PP; PET; PETG; PS; PLA (all with a density > 1g/cm ³)
Decoration*	Liners, Seals and Valves	HDPE; LDPE; LLDPE; MDPE; TPE-PE	PP; TPE-PP; PET, PETG, PS, PLA (all with a density > 1g/cm ³). Removable aluminium lidding; Removable silicon with density > 1 g/cm ³
	Label materials <i>(PSL, wet-glue labels, wrap-around labels, IML)</i>	Labels in PE (all with density < 1 g/cm ³); In-Mould-Labels in PE printed with < 1 wt% of the total packaging (except dark colours and bleeding inks)	Labels in PP, PO (with density < 1 g/cm ³); Labels in PET, PETG, PLA, PS (all with density > 1 g/cm ³); Labels in Paper without fibreless; PO-foamed labels; Any other In-Mould-Labels in PE (except bleeding inks)
	Adhesives for labels	Water soluble adhesive (@ less than 40°C); Water releasable adhesive (@ less than 40°C)	Non-water soluble or non-releasable adhesive approved by RecyClass in combination with filmic PO labels
	Sleeves	Sleeves in PE (all with density < 1 g/cm ³); Self-separable plastic and cardboard sleeves under mechanical pressure (sorting test mandatory)	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 (sorting test mandatory)
	Inks	Non toxic following the EuPIA Guidelines	
Direct Printing	Laser marked; Direct printing (inks + lacquer) representing < 1 wt% of the total packaging (except dark colours)	Any other direct printing; Cold transfer and hot stamping technologies that does not hinder the recognition of the underlying PE-polymer	
Other Components <i>(and decorative technologies)</i>	HDPE, LDPE, LLDPE, MDPE	PP PET; PETG; PS; PLA all with density > 1 g/cm ³ ; Electroplating on attachments (with density > 1 g/cm ³)	Aluminium; PVC; Glass components; Foams with density < 1 g/cm ³ ; Electroplating on attachments (with density < 1 g/cm ³)

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids

PE flexibles

Transparent

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



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
Main body	Main Material	PE-LD, PE-LLD; PE-HD	Multilayer PE/PP with PP ≤ 5%
	Material composition	A when PE content is > 95%; B when PE content is > 90%	C when PE content is > 70%
	Colours	Unpigmented; transparent	Light colours; translucent 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)
	Product residues <i>Easy to empty index</i>	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%
Attachments	Barrier	Barrier in the polymer matrix; SiOx and AlOx without additional coatings	< 5% EVOH (in polyolefin combination film); metallized layers without coating; Ecolam High Plus; VO+ LLDPE < 15% PA 6/66 copolymer with melting temperature < 192°C and incorporating minimum 10% PE-g-MAH tie layers
	Additives	Additives that do not increase the density higher than 0,97 g/cm ³	
	Closure Systems	PE-LD, PE-LLD, PE-HD	PP
	Liners, Seals and Valves	PE-LD, PE-LLD, PE-HD	PP, removable aluminium liddings
	Labels	PE	PP, paper labels without fiberloss
Decoration**	Adhesives	Water soluble or water-releasable at less than 60°C	
	Inks	Non-toxic (according to EUPIA guidelines)	
	Direct Printing	Laser marked print; Printed production or expiry date	Printing covering < 50%*
	Other Attachments	PE-LD, PE-LLD, PE-HD	PP
			Any other polymer (e.g. PET, PVC, etc.)
			D when PE content is > 50%; E when PE content is > 30%; F when PE content is <30%
			Dark colours; black; carbon black
			< 20 x 20 mm
			D if index is < 20%; E < if index is 25%; F if index is > 25%
			> 5% EVOH (in polyolefin combination film); any other PA barrier layer PVC, PVDC; any other barrier layer; foaming agents used as expanding chemical agents; aluminium
			Bio-/oxo-/photodegradable additives
			Additives that do increase the density higher than 0,97 g/cm ³ (CaCO ₃ , talc, glass fibers, etc.)
			Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm ³
			Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm ³
			Metallized labels, any other; paper labels with fibreloss
			Adhesives non-soluble in water or non-releasable in water at less than 60°C
			Inks that bleed; Toxic or hazardous inks.
			Printing covering > 50%*
			Metal, aluminium, PVC, PET, PETG, PS, PLA paper, foams with density < 1 g/cm ³

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids

PE flexibles

Coloured

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



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing	
Main body	Main Material	PE-LD, PE-LLD; PE-HD	Multilayer PE/PP with PP > 5%, Any other polymer (e.g. PET, PVC, etc.)	
	Material composition	A when PE content is > 95%; B when PE content is > 90%	C when PE content is > 70%	
	Colours	light colours; translucent colours	NIR-detectable dark colours (Sorting test)	
	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)	
	Product residues <small>Easy to empty index</small>	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	
	Barrier	Barrier in the polymer matrix; SiOx and AlOx without additional coatings	< 5% EVOH (in polyolefin combination film); metallized layers without coating; Ecolam High Plus; VO+ LLDPE < 15% PA 6/66 copolymer with melting temperature < 192°C and incorporating minimum 10% PE-g-MAH tie layers	> 5% EVOH (in polyolefin combination film); any other PA barrier layer PVC, PVDC; any other barrier layer; foaming agents used as expanding chemical agents; aluminium
Attachments	Additives	Additives that do not increase the density higher than 0,97 g/cm ³	Bio-/oxo-/photodegradable additives Additives that do increase the density higher than 0,97 g/cm ³ (CaCO ₃ , talc, glass fibers, etc.)	
	Closure Systems	PE-LD, PE-LLD, PE-HD	PP	
	Liners, Seals and Valves	PE-LD, PE-LLD, PE-HD	PP, removable aluminium liddings	Metal, aluminium, PVC, PET, PETG, PS, PLA, non PO or foams with density < 1 g/cm ³
	Labels	PE	PP, paper labels without fiberloss	Metal, aluminium, PVC, PET, PETG, PS, PLA, foiled paper, non PO or foams with density < 1 g/cm ³
Decoration**	Adhesives	Water soluble or water-releasable at less than 60°C		
	Inks	Non-toxic (according to EUPIA guidelines)		
	Direct Printing	Laser marked print; Printed production or expiry date; printing covering < 50%*	Printing covering > 50%*	Metallized labels, any other; paper labels with fibreless Adhesives non-soluble in water or non-releasable in water at less than 60°C Inks that bleed; Toxic or hazardous inks
	Other Attachments	PE-LD, PE-LLD, PE-HD	PP	Metal, aluminium, PVC, PETG, PS, PLA, paper, foams with density < 1 g/cm ³

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles

PS

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



	Class A-B	Class B-C	Non-recyclable	
	Full compatibility for reprocessing	Limited compatibility for reprocessing	Low (or no) compatibility for reprocessing	
Main Body*	Main Material	PS	PS foamed < 1 g/cm ³ ; Multilayers	
	Material composition	A when PS content is > 95%; B when PS content is > 90%	C when PS content is > 70%	D when PS content is > 50%; E when PS content is > 30%; F when PS content is < 30%
	Colours	Light colours	Dark colours (NIR detectable)	Non NIR detectable colours
	Size		Items compacted < 5 cm	Items compacted < 2 cm
	Product residues	A if the index is < 5%; B if the index is < 10%	C if the index is < 15%	D if the index is < 20%; E < if the index is 25%; F if the index is > 25%
	Barrier		EVOH	PA; PVdC
Attachments	Additives	Additives that are unavoidable in processing (stabilizers, antioxidants, lubricants, nucleating agents, peroxides) and in formulation (SBS copolymer) with density 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
	Closure System	PS	PP, PE, paper without fiberloss	PET; PETG; PVC; PLA; Paper with fiberloss; Any other material with density > 1 g/cm ³ ; Non-detaching or welded closures; Aluminium; metal
	Liner, seals and valves	PS	PP; PE; EVA; TPE; Removable aluminium lidding	PET; PETG; PVC; PLA; Any other material with density > 1 g/cm ³ ; Metal; metal foil; silicone
	Lids	PS	PP; PE; Removable aluminium lidding; Paper without fiberloss	PVC; Aluminium foil; paper with fiberloss; Multilayer PET/paper or PET/PS; Any other material with density > 1 g/cm ³
	Inks	Non toxic and non-bleeding inks (follow the EuPIA Guidelines)		Inks that bleed; Toxic or hazardous inks; PVC binders
	Label materials <small>(PSL, wet-glue labels, wrap-around labels, IML)</small>	Labels in 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; Metallised materials; Aluminium Paper with fiberloss; In-Mould-Labels;
Decoration*	Adhesive for labels	Water soluble adhesive (@ less than 40°C); Water releasable adhesive (@ less than 40°C)	Non-water soluble adhesive (@ less than 40°C); Non-water releasable adhesive (@ less than 40°C)	
	Sleeves	Sleeves in PS; Self-separable plastic and cardboard sleeves under mechanical pressure (sorting test mandatory)	Sleeves in PE, PO (with density < 1 g/cm ³); Cardboard sleeves without fiberloss (sorting test mandatory)	Sleeves that hinder the recognition of the PS; PET; PETG; PVC; PLA; Cardboard sleeves with fibre loss during recycling process; Metallised materials; Heavily inked sleeves; Aluminium
	Direct printing	Laser marked; Production or best-before date; Direct printing (inks + lacquer) representing < 1 wt% of the total packaging (except dark colours)	Any other direct printing	
Other components	PS	PP, PE, paper without fiberloss	PET; PETG; PVC; PLA; metal; metal foil; any other material with density > 1 g/cm ³	

PS is only being recycled in a limited number of countries

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS

Paper & cardboard

- Beverage cartons
- Glass
- Steel
- Aluminium



	Class A-B Full compatibility for reprocessing	Class C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
General bale quality requirements (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 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.)	Non-separable plastic components & aluminium during reprocessing
Colours		Paper suitable for de-inking	Paper not suitable for de-inking
Barriers (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)	Two-sided plastic coating/laminate, if fibre content < country specific threshold, Silicone or wax coating
Labels and Adhesives	Hotmelts with a softening point > 68°C and layer thickness of > 120µm	Water soluble adhesives	Insoluble adhesives; heavy foils; Latex/Hotmelt; Hotmelts with a softening point < 68°C
Fillers, Additives & Agents	Mineral fillers (talc, kaolin, TiO ₂ , starch, calcium carbonate); Wet strength agents without negative impact on fibre recovery and recycling Dry strenght agents (starch, polyvinylamine and GPAM)		Wet strength agents with negative or unproven impact on fibre recovery and recycling; Siliconizing agents
Inks & decorations	Non toxic following the EuPIA Guidelines	Metallic decoration (e.g. hot/cold foil transfer)	Inks that bleed; toxic or hazardous inks (Inks that are on the EuPIA exclusion list); mineral-oil based colours 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-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard

Beverage cartons

- Glass
- Steel
- Aluminium



	Class A-B	Class C	Non-recyclable
	Full compatibility for reprocessing	Limited compatibility for reprocessing	Low (or no) compatibility for reprocessing
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 Guidelines	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 For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons

Glass

- Steel
- Aluminium



	Class A-B	Class C	Non-recyclable
	Full compatibility for reprocessing	Limited compatibility for reprocessing	Low (or no) compatibility for reprocessing
Main Material	Soda-lime Glass; Ferro metals, Aluminium	Glass composites with metal or plastic layers Dealkalized Glass	Infusible materials such as Pyrex (oven-proof glass), crystal, ceramics, stoneware, porcelain Non-magnetic metals and metals non reactive to eddy- current such as pewter, brass, stainless steel...
Colours	Transparent colours with focus on clear white, brown and green	Other transparent colours: red, purple, blue, dark green...	Opaque and dark colours such as black, dark blue
Closure Systems	Steel	Polyolefins or aluminium caps Tamper-evident rings and cork stopper RFID tags	"Swing-top" closures with ceramic or metals Any closures that cannot be fully removed from the glass packaging
Labels and Adhesives	Paper or plastic labels (other than PVC/PVdC) if associated with a non-ultra-adhesive glue	PVC/PVdC labels if associated with a non-ultra-adhesive glue	Full body sleeve Labels associated with ultra-adhesive glue
Inks			Heavy metal inks
Direct Printing	Laser engraving	Solid colours direct print on glass Metallised inks wich allow transparency	Opaque lacquer or coating
Other Components			Wax Other infusible materials

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass

Steel

- Aluminium



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
Main Material	steel	steel mixed with other metals stainless steel tin layer	steel mixed with copper steel mixed with lead
Size		size <45mm	size <20mm
Closure Systems	steel closure	plastic closure non-steel metal	
Labels and Adhesives	paper label	plastic label	
Inks			toxic inks (EuPIA list)
Direct Printing	engraving and direct printing		
Other Components			product residues not allowed in the collection system

Design For Recycling

GUIDELINES for packaging

Material:

- PET-bottles
- PET-trays
- PP rigids
- PP flexibles
- PE rigids
- PE flexibles
- PS
- Paper & cardboard
- Beverage cartons
- Glass
- Steel

Aluminium



	Class A-B Full compatibility for reprocessing	Class B-C Limited compatibility for reprocessing	Non-recyclable Low (or no) compatibility for reprocessing
Main Material	aluminium	aluminium mixed with other non-ferrous metals	steel lead
Size		size <45mm (sorting > incineration)	size <20mm
Closure Systems	aluminium	plastic ferrous metals	
Labels and Adhesives	paper label	plastic label	
Inks			toxic inks (EuPIA list)
Direct Printing	engraving and direct printing		
Other Components			residues that limit the sorting product residues not allowed in the collection system

Our services:

**We support
you with:**

1

MasterClass Recycling

Are you curious to learn what happens to your packaging waste? How it gets sorted and recycled? And how can we organise this even smarter in the future?

Join our MasterClass and be amazed by the world of recycling.

2

Tests & Packaging Advice

Your packaging is our starting point! We provide tests and customised analysis so that you get the answers that you are looking for.

Together, we will make your packaging recyclable.

3

Certification of recyclability

We provide an objective certification of recyclability. We do this for packaging made from plastics (RecyClass), glass, paper & card, and metals (CERTIFY). Our certifications show how well your packaging can be recycled.

Proof to the world that you are recyclable!

4

BigData on Recycling

Based upon our operational BigData, we can tell exactly how your packaging is sorted in multiple sites across Europe. And we can tell how you are doing compared to your competitors.

Knowledge from the operational truth.

5

Country overviews

Each country handles packaging waste in a different manner. That is why it is important to understand what the rules are for the countries where your product is marketed. How does your packaging get treated?

Country specific waste knowledge for 69 countries worldwide

Expertise & certification on circular packaging

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

More info?



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