

How Labels & Sleeves can **support** recycling



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Your business?

(polymer)
science



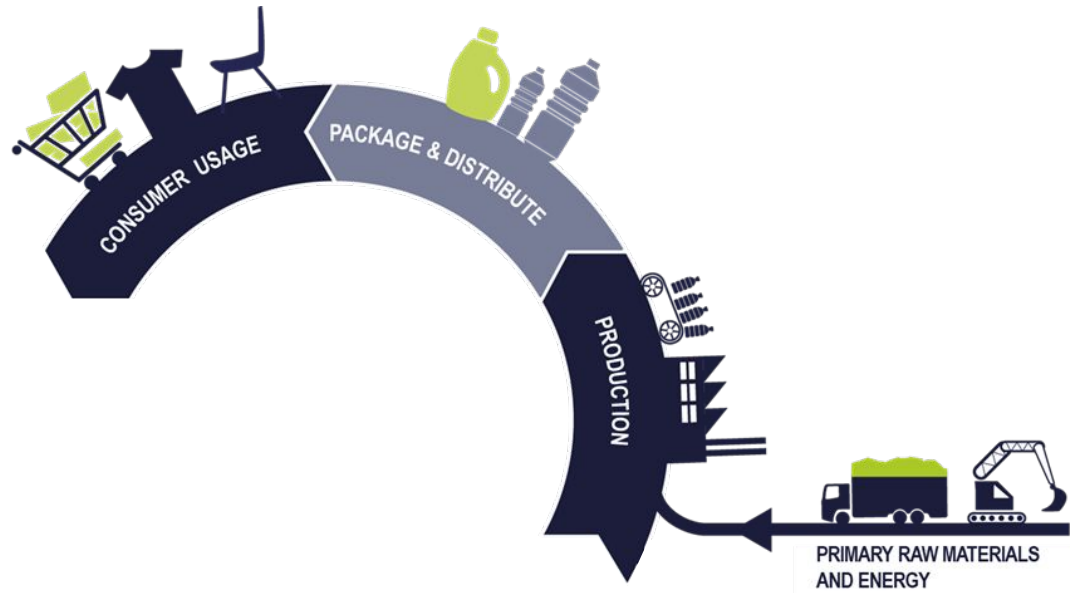
Your business?

Retail or
brand owner



Your business?

Retail or
brand owner



My business

Waste
&
Recycling



My business

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My business

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My business

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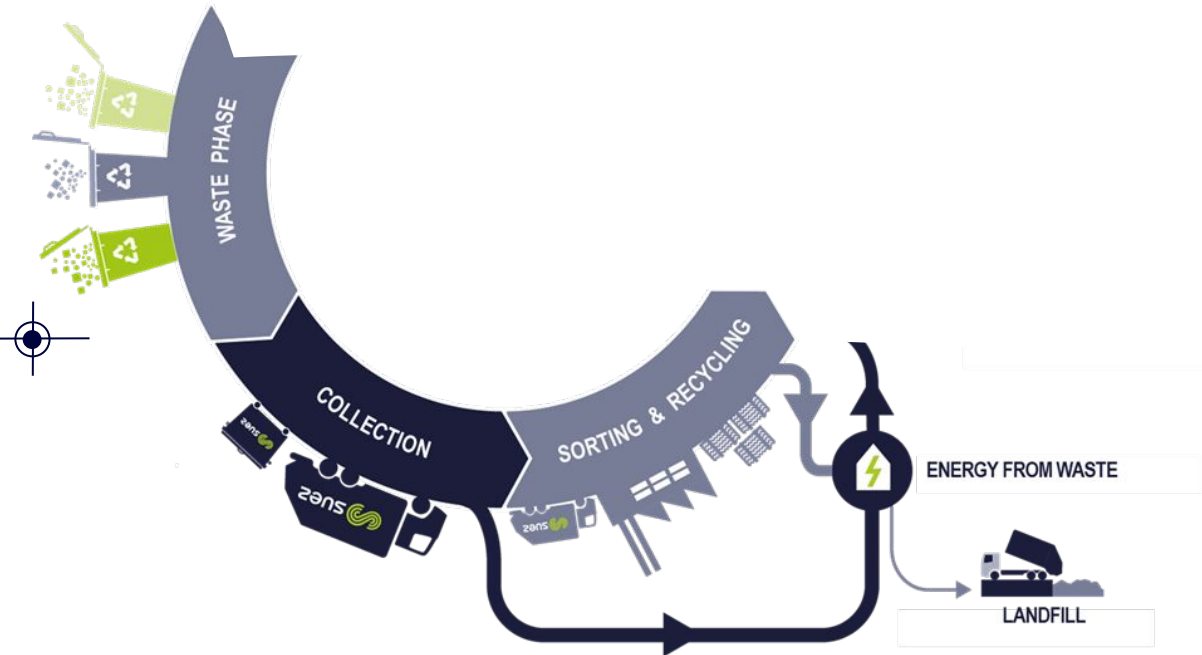
My business

Waste
&
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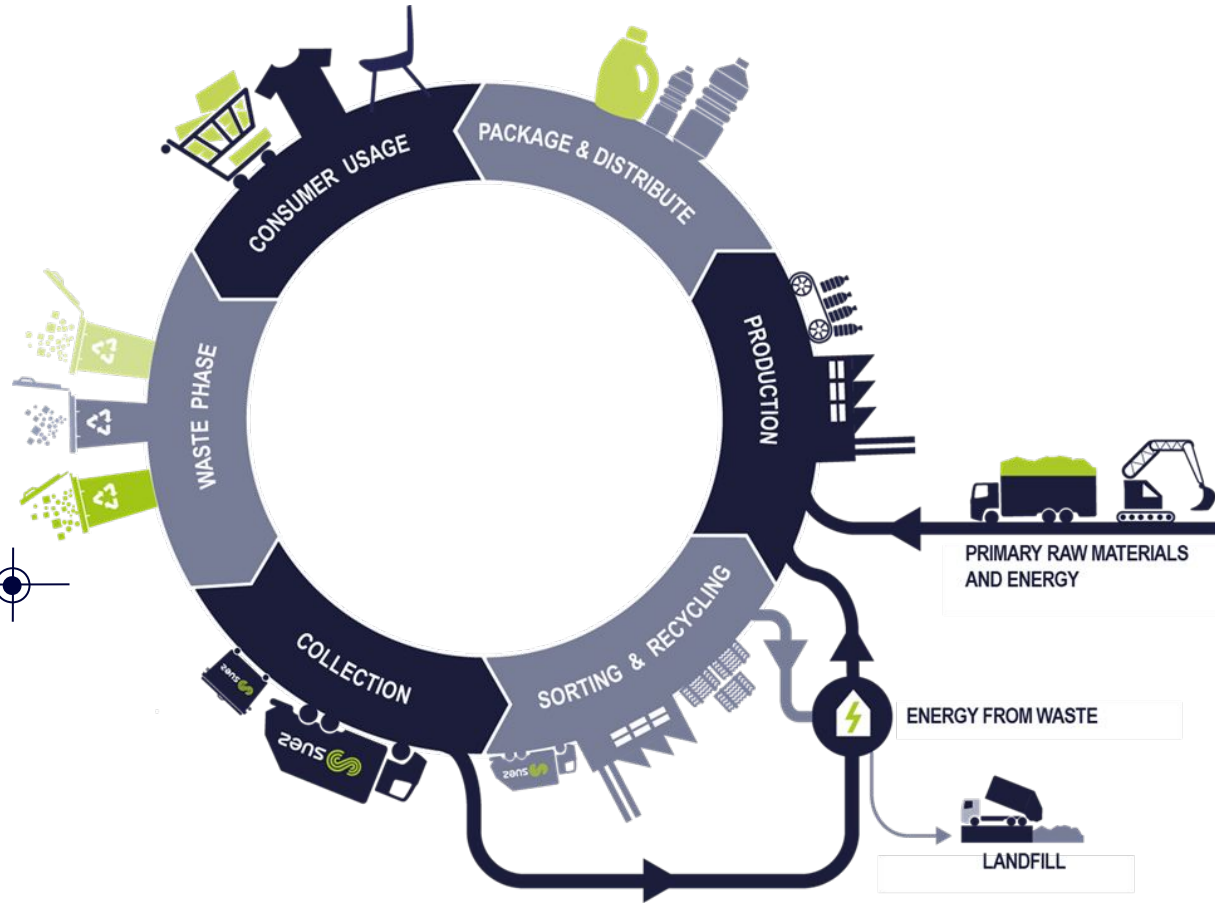
My business?

Waste & Recycling



Our business!

We need each other to close the loop





Packaging

The five essential P's

The FIVE essential P's of Packaging:

1. **Protect**
2. **Preserve**
3. **Promote**
4. **Price**
5. **Post-usage**

What does it mean 'to be recyclable' ?

Post Usage

The journey
of post-usage
packaging



to be
COLLECTED

+



to be
SORTED

+



to be
REPROCESSED

+



to be
APPLICATED

RECYCLABLE

Possible issues with recycling:

Issues with Recyclability

Why?

Design focus has mainly been on:

- Marketing & Communication
- Cost reduction in production

Leading to:

- Incorrect sorting
- Low recyclability
- Downgrading the quality of regranulate
- Stimulating the need for virgin polymers
- Increase in EPR-fees

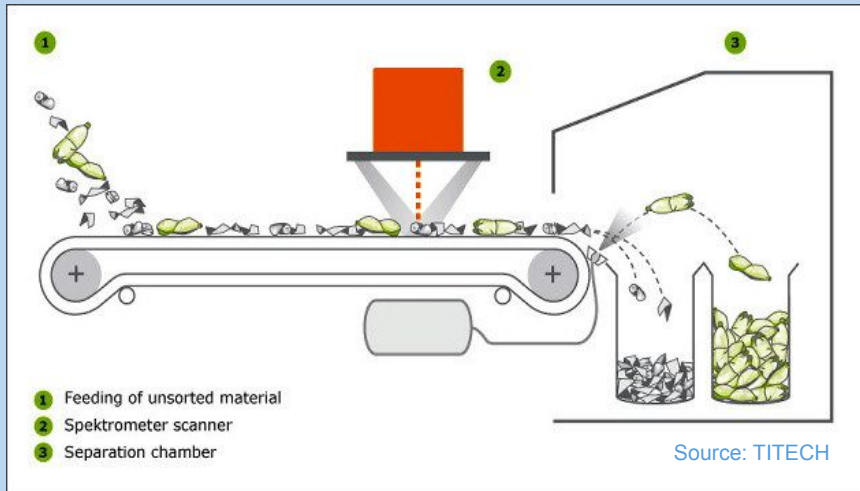
Sorting issue:

What to identify with infra-red?

Issues with sleeves in recycling:

Sorting: Identification by NIR:

- What am I detecting? sleeve or bottle?
- Size of the sleeve?
- What is the effect for the recycling route?



Let's design for recycling:

Tools available

Design
Guidelines



Let's design for recycling:

DESIGN GUIDELINES

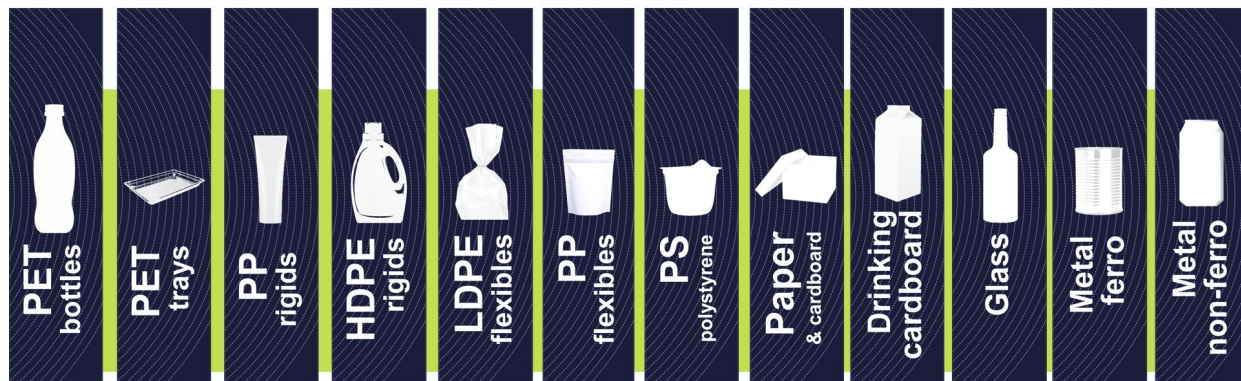
On the following pages you will find an overview of different types of materials used in packaging.

For each material, we provide you with details on:

1. **Recyclable** materials, which can be **fully recycled**,
2. **Non-recyclable** materials, which can **not be recycled**, but will not hinder the recycling of recyclable materials in the packaging)
3. **Conflicting** materials, that can **not be recycled** & will **also obstruct** the recycling of the recyclable materials in the packaging

Tools available

Design
Guidelines





DESIGN GUIDELINES



PET bottles

12 l

	Yes! 😊	Not conflicting 😊	No 😞
	Recyclable Materials Materials are known to be recyclable	Non-recyclable materials Materials are non-recyclable, but will not hinder the recycling	Conflicting Materials Materials will negatively impact or obstruct the recycling
Main Material	PET		PLA; PVC; PS; PETG
Colours	All transparent and light colours	Dark colours	Metallic; colorants with carbon black; opaque
Barrier	Coating clear (SiOx, AlOx, COx)	Multilayer with EVOH (< 3% mass) and no tie layers; Multilayer with PA (PET/PA/PET with PA < 5% mass); PTN alloy, PGA	Multilayer with EVOH (> 3% mass) or tie layers Multilayer with PA (PET/PA/PET with PA > 5% mass),
Additives		UV stabilisers; Acetaldehyde (AA) blockers; optical brighteners; oxygen scavengers;	Bio-/oxo-/photodegradable additives; nanocomposites
Closure Systems	PE and PP; all 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; metal
Liners, Seals and Valves	Single or multilayer material with density < 1 g/cm ³ (PE; PE+EVA; PP; foamed PET)	Silicone with density <0.95g/cm ³	Materials with density >1 g/cm ³ (e.g. PVC, silicone, metals)
Labels	PE; PP; OPP; all with density <1 g/cm ³ Labelsize of bottles > 500 ml: < 50% coverage Labelsize of bottles < 500 ml: < 70% coverage	Paper labels without fibre loss in pulping during sorting process; Lightly metallised labels (density <1 g/cm ³)	Materials with density >1 g/cm ³ (e.g. PVC; PS; PET; PETG; PLA); Metallised materials; non-detaching or welded labels; EPS; foamed PET and foamed PETG;
Sleeves	PE; PP; OPP; all with density <1 g/cm ³ Sleevesize of bottles > 500 ml: < 50% coverage Sleevesize of bottles < 500 ml: < 70% coverage		Materials with density >1 g/cm ³ (e.g. PVC; PS; PET; PETG; PLA); metallised materials; heavily inked sleeves; full body sleeves; EPS; foamed PET or foamed PETG; all with density <1 g/cm ³
Tamper Evidence W rap	PE; PP; OPP; all with density <1 g/cm ³		Materials with density >1 g/cm ³ (e.g. metal; PVC; PS; (G)PET); Metallised materials; EPS; foamed PET or foamed PETG
Adhesives		Soluble Adhesives (in water or alkaline at 60-80°C) Hot-melts ; pressure-sensitive labels	Non-soluble adhesives (in water or alkaline at 60-80°C)
Inks		No hazardous content in the ink (according to exclusion list EuPIA)	Inks that bleed; toxic or hazardous inks; metallic or other residual inks
Direct Printing	Laser marked	Production or best-before date	Any other direct printing
Other Components	Base cup, handles or other components, made PE,PP or OPP which are separated by grinding and float/sink - all with density <1 g/cm ³ ; PET		Other plastics and materials with density >1 g/cm ³ (e.g. metal, RFID tags); non-detaching or welded components; metal or glass items



Recycling

What to do with size of sleeve & label:

Labels and Sleeves in recycling:

SIZE of the label and sleeve

Label & Sleeve size:

- Bottles: less than 50% coverage of 2D area



Recycling

What to do with adhesives

Issues with Labels and Sleeves in recycling:

ADHESIVES will not be recycled.

Adhesives OK to use with PET:

- Soluble adhesives (in water or Alkaline at 60-80°C)
- Hot-melts
- Pressure sensitive labels

Adhesives not to use with PET:

- Non-soluble adhesives (in water or Alkaline at 60-80°C)

Recycling

What to do with adhesives

Issues with Labels and Sleeves in recycling:

ADHESIVES will not be recycled.

Adhesives OK to use with PP & PE:

- Water soluble adhesives (in ambient conditions)

Adhesives not to use with PP & PE:

- Non-water-soluble adhesives in ambient conditions
- Self-adhesive labels

Recycling

What to do with inks

Issues with Labels and Sleeves in recycling:

INKS will not be recycled.

Inks OK to use with PET, PE & PP:

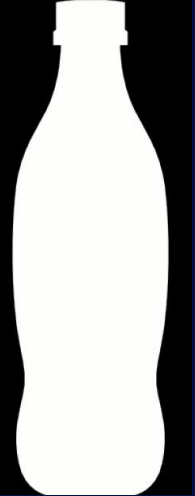
- Inks without hazardous content

Inks not to use with PET, PE & PP:

- Inks that bleed
- Toxic or hazardous inks
- Inks that are on the EuPIA exclusion list

Recycling

What kind of material



PET
bottles

Labels and Sleeves in recycling:

Labels & Sleeves will not be recycled.

Label & sleeve material OK to use with PET:

- Paper labels without fibre loss during washing process
- Density of material depending on type of main material:
- With PET: PE, PP, OPP all with density of $< 1,0 \text{ g/cm}^3$

Labels & sleeve material not to use with PET:

- Paper labels with fibre loss during washing process
- Materials with density $> 1,0 \text{ g/cm}^3$
- PVC, PS, PET, PETG, PLA
- 'biodegradable' plastics
- Foamed materials (EPS, foamed PET, etc)

Recycling

What kind of material



PP & PE
rigids

Labels and Sleeves in recycling:

Labels & Sleeves will not be recycled.

Label & sleeve material OK to use with PE & PP:

- HDPE, LDPE, LLDPE, MDPE, PP
- Paper labels without fibre loss during washing process
- PET, PETG, PS,

Labels & sleeve material not to use with PE & PP:

- Paper labels with fibre loss during washing process
- PVC, PS,
- PLA and other 'biodegradable' plastics
- Foamed materials (EPS, foamed PET, etc)

Recycling

What kind of material



**Metals
& glass**

Labels and Sleeves in recycling:

Labels & Sleeves will not be recycled.



Label & sleeve material OK to use with glass & Metals:

- All

EPR-fees:

Financial incentives

Label & sleeve recycling:

EPR-fees:

- More and more EPR-systems are integrating incentives for usage of PCR and recyclability of packaging
- The Dutch EPR systems provides a 40% discount for recyclable rigid plastic packaging (= €260,- / ton material used).

Label & sleeve rules for the discount:

- PE or PP packaging:
 - Same material as main component. No paper
- PET packaging:
 - No PET- labels or sleeves. PE, PP or paper are ok
- Size if different material then main component is used:
 - >500ml: max 70% coverage
 - <500ml: max 50% coverage

Please check KDV recyclecheck

The solution

Chicken AND Egg



Let's co-create the design for recycling:

- Understanding recycling
- Can we find alternatives? (Pigments, barriers, etc.)
- Are all 'requirements' still valid? (Shelf-life)
- True cost? Eco-fees in EPR-systems
- Use Post Consumer Recycled plastics if possible (PCR)

Let's co-create new recycling-technologies:

- Chemical Recycling:
 - oil, depolymerisation, chemicals (ethanol & methanol)
- Image recognition & watermarking
- Robotization & artificial intelligence

Thank you for your **Attention!**

A
DISCOVER
Workshop



Workshop on the world of recycling incl. visit to our sorting installation.

B
EXPLORE
Focused diagnose



Dedicated analysis and advice on recyclability of existing packaging.

C
CO-CREATE
Dedicated expertise



Support in creating new packaging to ensure full recyclability.

D
CERTIFY
My recyclability



Full certification on the recyclability of your packaging.



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Enabling recycling (PET bottles) CleanFlake™ portfolio

- Enables PET Bottle-to-Bottle recycling
- ‘Plug and Play’ solution compatible with existing value chain
- Approved by relevant bodies in Europe and the USA

Sustainability fundamentals and performance

- Separates cleanly from the PET flake during the recycling process (sink-float separation)
- Available with rPET liner
- Approved by Returpack and Infinitem for PET bottle recycling at CleanAway
- Achieved 100% wash-off from PET flakes requirements of Petcore
- Adheres design guidelines EPBP PET recycling



CleanFlake™—The Sink-Float Principle

