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Better quality of life, through better packaging, for more people

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World Packaging Organisation (WPO) - **64 Member Countries**

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Guiding Sustainable Design Principles

Where do we start with our packaging design?

I have no idea what design principles to follow…

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Sustainable Packaging Design Guidelines

1 Design for recovery

2 Optimise material efficiency

3 Design to reduce product waste

4 Eliminate hazardous materials

5 Use recycled materials

6 Use of renewable materials

7 Design to minimise litter

8 Design for transport efficiency

9 Design for accessibility

10 Provide consumer information on sustainability

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Global Packaging Design for Recycling Guideline

Waste Stream Mapping Tools

WPO Sustainability Position Papers

WPO Sustainability Survey

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WPO Sustainability case studies

WPO Save Food Packaging case studies

WorldStar Save Food Packaging Special Award

WorldStar Sustainability Special Award

WPO Sustainability & Save Food Working Group

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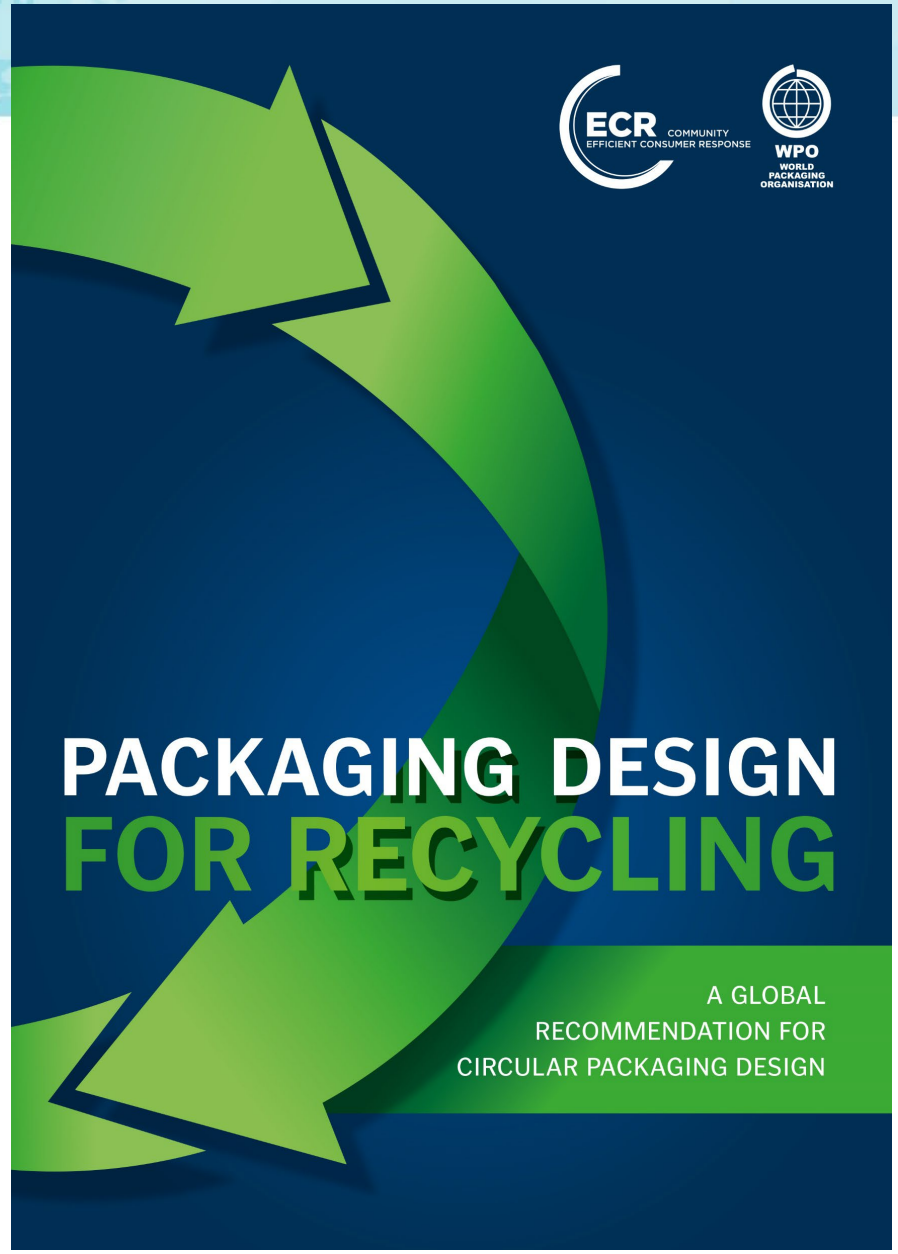
Global Packaging Design for Recycling Guideline



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Sustainability Design Rules

1. **Ensure product protection** (Fit-for-Purpose & Functional)
2. **Calculate packaging** – KPIs for packaging (holistic sustainability assessment)
   - Recyclability
   - Packaging weight
   - Carbon Footprint
   - Emptiability
   - Others: Recycled Content, Renewable Materials
3. **Benchmark** – calculate against competitive packaging
4. **Optimise packaging against KPIs**

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Global Packaging Design for Recycling Guide

Global Packaging Design for Recycling Guide

- **Increase recyclability and recycling rate of packaging**
- **Create a common understanding of Circular Packaging Design**
- **Provide a practical design tool - easy to use and understand**
- **International harmonisation of design standards**
- **Stimulate global education and training in Circular Packaging Design**

How to Use the Guide

EXAMPLE
COLLECTION FLOW NOT AVAILABLE

To download this guide and your respective country waste stream sheet, please go to: https://worldpackaging.org/wpo/45/

EXAMPLE
COLLECTION FLOW NO INFORMATION AVAILABLE

To download this guide and your respective country waste stream sheet, please go to: https://worldpackaging.org/wpo/45/

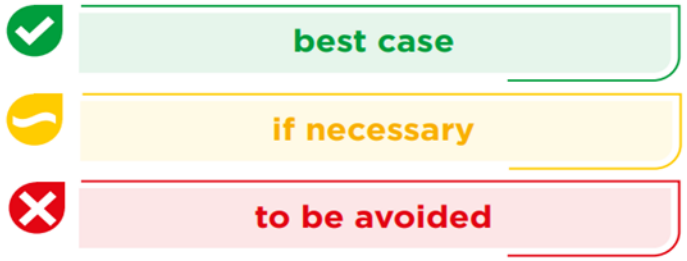
Easy to Use & Understand

Colour coding

Main Criteria

Traffic Light System

Packaging types for which detailed recommendations already exist are divided into three categories (green, yellow, red). Design recommendations for packaging types – for which a further level of detail is currently being worked on – are divided into the categories green and red. In some cases, further comments are made on individual design criteria, which can be found in Chapter 5 / Glossary.



Material-Specific recommendations

2.3.1 Plastics

- Use materials that are as widely available as possible (**PP, PE, PET**).
- Recyclable material combinations (ideally **mono-materials**).
- The surface area of the base material should, at best, be covered to a max. 50 %[2] with the sleeve/label/banderole.
- Easy mechanical separability of the individual components in the sorting process.
- If possible, use transparent materials.
- As few additives as possible.
- Adhesives recyclable or washable under certain conditions.
- No barrier layers, but if necessary: **carbon plasma coating**[3], **SiOx**- or **Al**[2]**O**[3] barrier.

- Avoid small parts that can be separated by the last consumer (**Littering**).
- Non-recyclable material composites (see specific design recommendations).
- Density-changing **additives** (for example, density-increasing additives in PE and PP packaging lead to problems in sorting).
- Use of **Carbon black** -based inks

Material-Specific recommendations

2.3.3 Glass

- Standard colouring in green, brown, white (transparent) or related shades.
- Regular three-component packing glass (quartz sand, soda, **limestone**).
- Engravings and paper labels (wet-strength).

- No packaging glass, such as heat-resistant glass (e.g.: boro-silicate glass).
- Lead crystal, cryolite glass.
- Ceramic parts.
- Full-surface, colour-coated bottles.
- Full-surface **sleeves**.
- Permanently adhesive and large-area plastic labels.

Material-Specific recommendations

2.3.5 Aluminium

- **Non-ferrous metal parts**
- Direct printing process.
- Embossing or direct printing.
- Paint coating.
- Closures made of aluminium

- Aluminium in material composite.[6]
- Non-compliant colours.
- Aerosol cans with hydrocarbon substance-based propellants and/or residual content.

Recommendations per packaging type

3.1 BOTTLES

3.1.1 PET

MATERIAL

- Transparent mono-PET is best suited for high-quality and material-identical recycling.
- If barrier requirements exist, a silicon oxide (**SiOx**), an aluminium oxide (**Al_2O_3**) barrier or a **carbon plasma coating** (only for coloured bottles) can be used, as these do not significantly affect the quality of the recyclate.

- Pale, light, dark or opaque material can be collected or recycled, but of lower quality than transparent material.
- Additives such as **UV stabilisers**, **optical brighteners** and **oxygen absorbers** should only be added if necessary.
- In principle, the use of barriers should be avoided. However, **PA** barriers (mass fraction <5 wt %), a multilayermaterial with **PGA**, **PTN** alloys and **TPE** or **PO**-based barriers can be used under certain circumstances.

- It is important to avoid the use of materials with a density <1 g/cm³ and density-changing additives in the **polymer,** as **PET** sorting is based on density separation.
- Barriers made of **EVOH** and **PA** (mass fraction > 5 wt. %) as well as other inserted barriers can sometimes strongly impair the recyclate quality.
- Other types of PET (e.g. **PET-G**) as well as a composite with other plastics such as **PLA, PVC** and **PS** are not compatible with the PET fraction and are considered interfering materials.
- Special additives such as oxygen/bio/**Oxo-degradable** additives, **nanoparticles** and a **PA additive** damage the recyclate. Furthermore, the addition of oxo-degradable additives will be banned throughout the EU from 2021 due to the Single-Use Plastics Directive.
- **Carbon black** -based colours can prevent sorting. Metallic and fluorescent colours must be avoided due to the **contamination** of the recyclate.

DECORATION AND OTHER COMPONENTS

- Direct printing on the packaging should be avoided if possible. If this is necessary, the printing inks must at least be **EuPIA**-compliant and **non-bleeding** to avoid potential **contamination.**
- The **batch coding** and the indication of the **best-before date** should ideally be carried out in the form of an embossing or laser marking.
- If labels and **sleeves** are used, they should cover a maximum of 50% of the packaging[8] and be made of a material with a density < 1g/cm³ (e.g. **PP**, **PE**) so that they can be separated in the sorting process.

- Wet-strength paper labels are preferable to conventional paper labels because no fibres come out of them in the washing process that can contaminate the recyclate.
- The batch coding and indication of the best-before date can, if necessary, also be carried out by means of minimal direct printing with other **coding** systems (e.g. **ink-jet**), provided that food-grade inks are used.

- Extensive direct printing on the packaging is disadvantageous, as released printing inks can impair the clarity of the recyclate or contaminate the recycling stream via released printing inks in the wash water (potential formation of **NIAS**).
- Large-scale decorations covering more than 50% of the packaging surface[8] can impair the sorting of the packaging.
- Labels and sleeves made of a material with a density > 1 g/cm³ (e.g. **PVC,** OPS, **PLA**), **PET** as well as non-wet-strength paper labels can contaminate the PET fraction.
- Adhesive materials containing metal or aluminium (with a layer thickness of > 5 µm) can lead to unwanted sorting into the metal fraction.

CLOSURE SYSTEM

- Closures are best made of PP, **HDPE** or other materials with a density < 1 g/cm³, as they can be separated from PET in the recycling process.
- If sealing foils are used, they must be easy to remove without leaving any residue.
- Closure systems without **liners** are preferred. If necessary, **EVA** or **TPE** liners should be used.
- From 2024 onwards, the adhesion of the closure (according to Article 6, 2019/904/EC) must be guaranteed for the time of intended use for beverage containers up to 3 litres.

- If a sealing and other components made of silicone are necessary, they should have a density < 1 g/cm³ to enable separation in the sorting process.

- Components made of metal, aluminium-containing materials (with a layer thickness > 5 µm), **duroplast**, **PS, POM** and PVC are considered interfering materials, as they interfere with the sorting and reprocessing of the material and can damage extruders and equipment, among other things.
- This also applies to non-removable sealing films or silicones, glass and metal springs of pump systems or materials with a density > 1 g/cm³.

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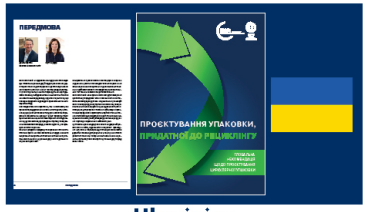
Global Packaging Design for Recycling Guide

Czech

Georgian

Hungarian

Japanese



Ukrainian

Latvian

German

Arabic

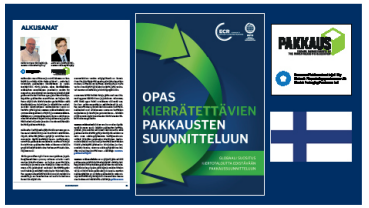
Polish

Portuguese

Thai

Indonesian

Spanish



Finnish

English

WITH MORE TO COME SOON

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Waste Stream Mapping Tools – 32 countries

Waste Stream Mapping Tools – 32 countries

WASTE STREAM MAPPING TOOLS

LATVIA

Packaging waste streams Latvia		
Composite beverage carton		~
Paper		✓
Aluminium		✓
Tin plate		✓
Glass		✓
PS	rigid	✗
	flexible	✗
PVC	rigid	~
	flexible	✗
PE	rigid	✓
	flexible	~
PP	rigid	✓
	flexible	~
PET	blow moulded	✓
	thermoformed	~
	flexible	~

Legend

Packaging waste stream infrastructure	Rating	Description
available	✓	There is an area-wide collection of the material (> 50 %)
limited available	~	The material is collected in some regions or municipalities, but the total amount is 10 - 50 %.
not available	✗	In this country is no waste stream for that material available or the collected waste amount for that material is < 10 %.
No information	n.i.	No information is available for this country at the time. There will be further research.

*according to Plastic Recyclers Europe

For further information, please contact: info@worldpackaging.org

SINGAPORE

Packaging waste streams Singapore[1]		
Composite beverage carton		✓
Paper		✓
Aluminium		✓
Tin plate		✓
Glass		✓
PS	rigid	✗[2]
	flexible	✗
PVC	rigid	✓[3]
	flexible	✓[3]
PE	rigid	✓
	flexible	✓
PP	rigid	✓
	flexible	✓
PET	blow moulded	✓
	thermoformed	✓
	flexible	✓

[1] Singapore has a commingled recycling collection system, in which all its recyclabl are collected together and sorted in a material recovery facility
[2] Rigid PS bottles are in the recyclables stream; foam PS food containers are not collected in the recyclables stream
[3] Not found in recyclables stream

CZECHIA

Packaging waste streams Czechia		
Composite beverage carton		✓
Paper		✓
Aluminium		✓
Tin plate		~
Glass		✓
PS	rigid	✓
	flexible	✓
PVC	rigid	✗
	flexible	✗
PE	rigid	✓
	flexible	✓
PP	rigid	✓
	flexible	✓
PET	blow moulded	✓
	thermoformed	✓
	flexible	✓

Legend

Packaging waste stream infrastructure	Rating	Description
available	✓	There is an area-wide collection of the material (~ 50* %)
limited available	~	The material is collected in some regions or municipalities, but the total amount is 10 - 50* %.
not available	✗	In this country is no waste stream for that material available or the collected waste amount for that material is < 10 %.
No information	n.i.	No information is available for this country at the time. There will be further research.

*according to Plastic Recyclers Europe

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32 COUNTRIES

Australia • Austria • Belgium • Brazil • China • Cote d'Ivoire • Czechia • Denmark • Finland • France • Germany • Greece • Hungary • Ireland • Israel • Italy • Japan • Kenya • Latvia
Luxembourg • Netherlands • New Zealand • Russia • Singapore • Slovakia • Spain • Sweden • Switzerland • United Arab Emirates • United Kingdom • United States of America • Vanuatu

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Extended Producer Responsibility (EPR) updates

26 COUNTRIES


BRAZIL


CHINA


CZECH REPUBLIC


DENMARK


ESTONIA


EUROPEAN UNION


FINLAND

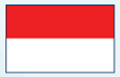

FRANCE


GERMANY


GREECE


HUNGARY


INDIA


INDONESIA


ITALY


LATVIA


MALAYSIA


THE NETHERLANDS


NORWAY


PHILIPPINES


PORTUGAL


SINGAPORE


SLOVAKIA


SPAIN


SWITZERLAND


THAILAND


VIETNAM

Circular Economy for Packaging

To create a circular economy for packaging we need to:

- Design out waste at the start
- Harmonise packaging design standards
- Ensure all packaging is recycle ready
- Eliminate Chemicals of Concern
- Reduce virgin materials as much as possible
- Eliminate problematic materials
- Re-use materials for as long as possible

The objective is to keep all packaging out of landfill, the waterways and the environment and to ensure that we stay within our planetary boundaries.

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Thank You

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