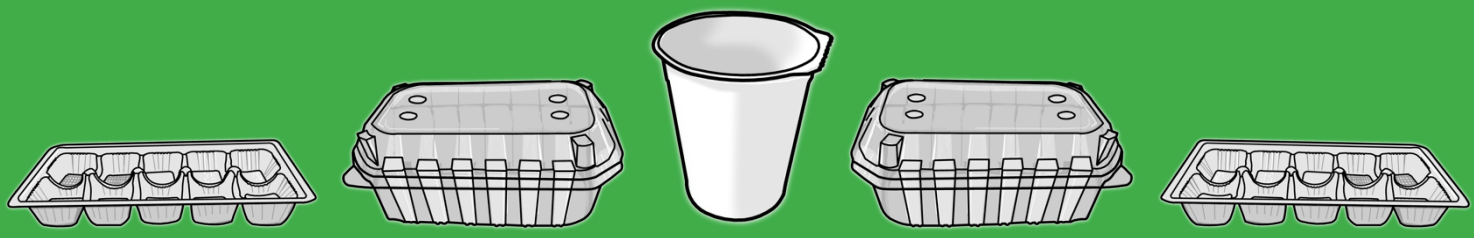


Recommendations «Design for Recycling»

Plastic Cups, Bowls, Trays, Blisters

Drehscheibe Kreislaufwirtschaft
by Swiss Recycling

Allianz Design for Recycling Plastics
by REDILO

Version 11/03/2020
Created by Liane Jehle, REDILO GmbH
https://www.circular-economy.swiss/schwerpunkte/tp-2-becher-schalen-trays-blister/

Content

1. Introduction

Overview Drehscheibe Kreislaufwirtschaft / Allianz Design for Recycling Plastics

A functioning recycling economy requires a holistic view and approach that takes into account the specific recycling possibilities according to the state of the art, the possible uses of the recycled material and the information and sensitization up to the consumer.
The key to successful implementation is cooperation across the entire packaging value chain. This is precisely why the Swiss «Drehscheibe Kreislaufwirtschaft» and the «Allianz Design for Recycling Plastics» are working closely together on various topics, exploiting synergies and offering the partners benefits through joint theme platforms, main topics and specific tools and services.

Objectives of the Recommendations and Procedure

Recyclability is the basis and the prerequisite for sensible separate collection - in general for a high-quality, clean and sustainable recycling management of plastics. In order to consider and ensure optimal recyclability already during packaging and product development, industry recommendations and specific technical guidelines are developed, continuously revised and thus kept up to date. This is done together with partners along the entire value chain.

Networking and contact

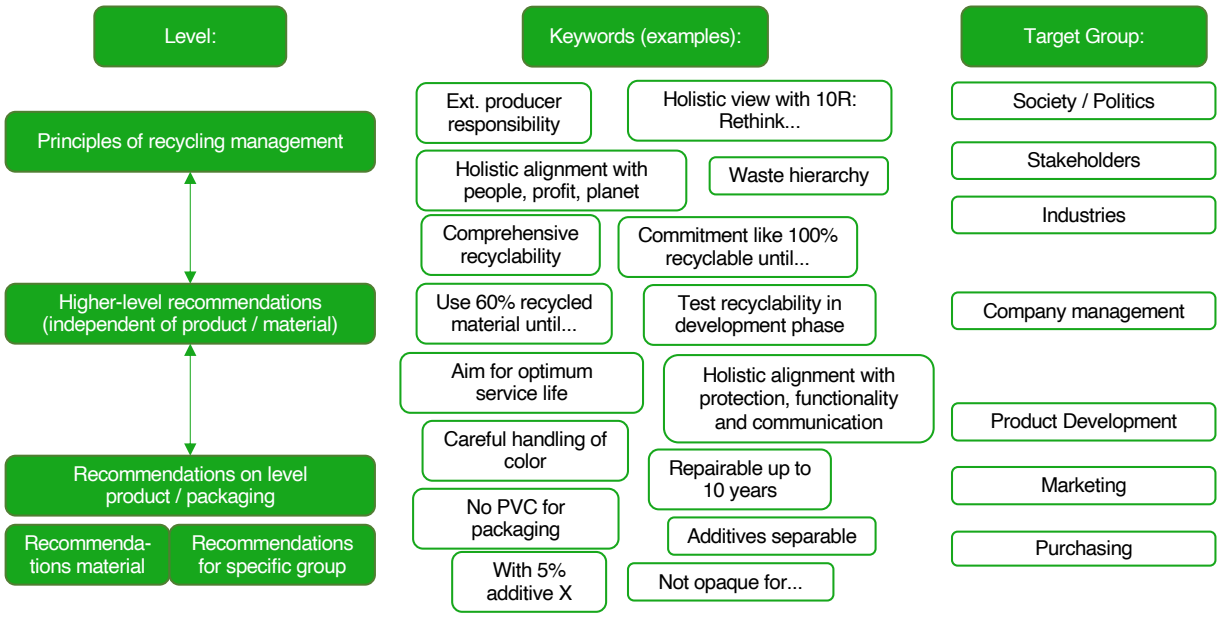
Wherever possible, these recommendations are based on internationally developed recommendations, standards and practical tests. A «Swiss isolated solution» is deliberately avoided. Nevertheless, the specific situation in Switzerland should be taken into account.
The recommendations considered here can be found on our website under the corresponding focus:

- Design for Recycling Guidelines, July 2020, RecyClass
- Circular Packaging Design Guideline, September 2020, FH Campus Wien
- Design Guidelines, 2019, EPBP
- Recyclability by Design, 2019, RECOUP
- Recyclability of Plastic Packaging, Dezember 2016, COTREP
- Design for Recycling Guidelines, July 2019, SUEZ.circpack
- Design 4 Recycling, September 2019, Der Grüne Punkt

Do you have questions about the recommendations or feedback? Mrs. Liane Jehle from REDILO GmbH is looking forward to your contact: jehle@redilo.ch

2. General Recommendations

Development of Principles and Recommendations for Recycling Management



The recommendations are embedded in a landscape consisting of different actors. It is important that the communication is tailored to the target group. For example, it is the task of the company management to anchor the circular economy in its own organization. This anchoring helps to implement the recommendations on an operational level in the corresponding areas such as purchasing or product development. There are generally valid, superordinate rules for good recyclability, which are represented in the following table.

5 General, Golden Rules «Design for Recycling»

Keyword	Details
Recyclable materials	Use of permanent or regenerative materials. Check recycled material content. Check new materials for compatibility with the existing infrastructure.
Monomaterial	Mono material results in a high recycled quality. Check material combinations for separability.
Minimization of additives	Careful use, e.g. printing ink or adhesives, check effects on the quality of the fractions as well as on processes.
100% recyclable	Tested and confirmed on the basis of state-of-the-art technology in the relevant region, including compatibility with the collection, processing and recycling infrastructure.
Cooperation	Commitment to the development and communication of the «Design for Recycling» recommendations within and outside the own organization. Early consideration of the recommendations in the development phase of a packaging.

3. Specific Recommendations for Plastic Cups, Bowls, Trays, Blisters

Golden Rules «Design for Recycling» for Plastic Cups, Bowls, Trays, Blisters

Keyword	Details
Color	If possible, use of uncolored plastics.
Lid / Seal	Use of lidding films / seals that can be completely removed by the consumer.
Glue / Residue	Use of water-soluble glues. No adhesive / glue residues when removing the cover foil / seal.
Packaging design	The packaging should be designed in such a way that the consumer can easily fulfil the requirement of residual emptying. Avoidance of small parts, which could be released into the environment by improper handling by the consumer.
Inserts / Inlays	If possible, do not use inserts or inlays.

RECYCLABILITY according to this guideline

This guideline describes the material and physical requirements for the material / theoretical recyclability of the product or packaging to be fulfilled.

The guideline does not yet say anything about the actual recyclability, which, depending on the country, established collection structures, appropriate treatment and recycling processes according to the state of the art as well as the use of the recovered recyclate.

The following definitions apply (source: http://realcycle.ch/rezyklierbarkeit.html):

Material recyclability of packaging components:
There is a process that can restore used material to its original state (e.g. melting process).

Theoretical recyclability of a product:
In addition to material recyclability, theoretical recyclability defines that a product consists of a mix of materials (including labels, lids, etc.) that can be recycled. If it is a composite product (i.e. composites such as multi-layer plastic packaging or multi-layer packaging made of several materials), it must be possible to disassemble it into the materials, whereby the material recyclability applies to all partial materials.

Actual recyclability of a product:
In addition to the theoretical recyclability, there is a collection and recycling system in which the materials can be turned into high-quality secondary raw material within a geographically reasonable radius. The secondary raw material must make up >70% of the input material, must be of high quality (free of pollutants and with as similar physical properties like virgin material), and enable local loop closure.

Important:
If only the material and theoretical recyclability, i.e. the criteria of this guideline, are fulfilled, a product or packaging may not yet be advertised as «recyclable»!

3.1 PE / PP

Status October 2020

Topic / Classification		Remarks	Material / theoretical recycling fulfilled	Material / theoretical recycling partially fulfilled	Material / theoretical recycling not fulfilled
Packaging	Material	1	PE-LD, PE-HD; PP (density <1 g/cm³)	PE / PP composite	PET / PE and PET / PP composite; Polyolefin composite with a density >1 g/cm³
	Color	2	No color; transparent clear	light, transparent colors	transparent dark, opaque colors and black (carbon black); metallization
Additives	Barriers	3	SiO_x, Al_2O_3	EVOH (up to 5%)	PA (including Nylon MXD6), PVDC, EVOH (over 5%)
	Other	4	Additives that increase the density of the main plastic (PE or PP) by no more than 4%	Clarifier (additives for transparency and gloss)	Additives that increase the density of the main plastic (PE or PP) by more than 4%
Cover	Cap / Cover	5	PE, if main plastic = PE; PP, if main plastic = PP	PE on PP-«body»; PP on PE-«body»	Any other material (e.g. PS, PVC, duroplastics, aluminum, steel)
	Cover foil / Seal (circuit board)	6	PE, if main plastic = PE; PP, if main plastic = PP; cover film / seal is completely removable by the consumer, no adhesive / glue residues when removing the cover film / seal	PE on PP-«body»; PP on PE-«body»; Removable Aluminum Fasteners	Any other material, not completely removable lid films / seals
Decoration / Labels	Direct printing / printing ink	7	EUPIA-compliant (non-toxic); Only minimal printing (date, product no.); inks that come off in the recycling process (e.g. laser printing)	anything beyond minimal printing (date, product no.) with peeling colors (e.g. laser printing)	Bleeding colors; toxic colors; metallic colors; colors that do not come off in the recycling process
	Labels / Sleeves	8	Same material as main plastic (PE or PP); < 50% of the surface (main packaging); Light, non-opaque colors	PE on PP «body» or PP on PE «body»; material combinations with a density >1 g/cm³ (e.g. PET); paper labels (wet-strength); > 50% of the surface (main packaging), in-mould labels	PVC, PET, metallization, materials with a density <1 g/cm³ (except main plastic)
	Glues	9	Water soluble glues (up to 60°C)	Water soluble glues (up to 80°C); hot-melts	all other glues; non-water-soluble glues; pressure sensitive labels or permanently adhesive labels
Other	Supplements	10	No other components / additives than the main plastic (PE or PP) desired	Paper and cardboard	PVC / PS / EPS / PU / PA (nylon) / PC / PMMA; thermosets, metals
	«Smart packaging»	11		various functions (see remarks)	
	Inserts / Inlays	12	No inserts / inlays	Inserts / liners made of HDPE / LDPE / PP; absorbent pads; air cushions; paper and cardboard; all inserts / liners should be completely removable	non-conforming absorbent pads

3.1 PE / PP

Explanations to the Technical Guideline Plastic cups, trays, trays, blisters PE / PP

Glossary	
Carbon black	Soot-based masterbatch (color) for plastics.
In-Mould-Labeling (IML)	Process for applying inscription labels directly in the mold during molding.
Smart Packaging	Expected future developments in the packaging industry, especially equipment with sensors.

Remarks	
1	No multi-material composites, whenever possible only mono-material packaging.
2	
3	Barriers are basically limiting; whenever possible, do not use barriers.
4	
5/6	Whenever possible, unprinted, completely removable lidding film / seal made of the same material as the main packaging.
7	Testing for EUPIA conformity is required.
8	Main packaging = cup, tray, tray or blister (without lidding film / seal); surface in the sense of the outer surface of the packaging
9	
10	
11	In the context of digitization, the field of «Smart packaging» brings new challenges in sorting and recycling, which must be examined on a case-by-case basis. Smart packaging: packaging with additional options. Active packaging that interacts with the contents. Intelligent packaging with e.g. diagnostic or indicator function or information, automation, marketing or protective function via sensors, barcodes, LEDs, NFC, loudspeakers, radio chips, displays, etc.
12	Absorbent pads in the LM-SB area - meat, poultry, fish: Absorbent or cushioning packaging pad for food products such as meat, poultry, fish in plastic trays or MAP trays, MAP trays.

3.2 PET

Status October 2020

Topic / Classification		Remarks	Material / theoretical recycling fulfilled	Material / theoretical recycling partially fulfilled	Material / theoretical recycling not fulfilled
Packaging	Material	1	PET		PET-G, C-PET, foamed PET, PLA, PVC, PS; All multi-material composites (PET / PE and PET / PET-G); materials with a density >1 g/cm³
	Color	2	transparent clear; transparent blue (light)		transparent dark color opaque, dyed; metallization
Additives	Barriers	3	PET-based oxygen absorbers without yellow discoloration after EPBP oven test	PET-based oxygen absorbers with low yellow discoloration after the EPBP oven test	EVOH, PA; each other barrier; each other oxygen absorber
	Other	4	Surface coating with silicone (coating area only), «Antiblocking Masterbatch» (max. 3%); materials without influence on transparency (clarity)	UV stabilizers, AA-blockers, optical brighteners, oxygen absorbers, anti-static additives; materials with low influence on transparency (clarity)	Nanoparticle; Bio- / oxo- / photodegradable additives
Cover	Lid foil / seal unprinted (circuit board)	5	PET; materials or combinations with a density <1 g/cm³ (floating); lidding film / seal completely removable (by consumers); no adhesive / glue residues when removing the lidding film / seal (EPBP tests); SiO_x or AlO_x barriers		All materials with a density >1 g/cm³
	Lid foil / seal printed (circuit board)	6	If possible unprinted lidding film / seal; materials or combinations with a density <1 g/cm³ (floating); lidding film / seal completely removable, no adhesive / glue residues when removing the lidding film / seal (EPBP tests); foamed PET (thermostable up to 90°C); SiO_x or AlO_x barriers		All materials with a density >1 g/cm³
Decoration / Labels	Direct printing / printing ink	7	EUPIA-compliant (non-toxic) Only minimal printing (date, product no.); inks that come off in the recycling process (e.g. laser printing)	anything beyond minimal printing (date, product no.) with peeling colors (e.g. laser printing)	Bleeding colors; toxic colors; Inks that do not come off in the recycling process
	Labels / Sleeves	8	Whenever possible no labels / sleeves; < 50% of the surface (main packaging); Material with a density <1 g/cm³	BPA-free paper labels, without fiber loss, floating; > 50% of the surface (main packaging)	Materials with a density >1 g/cm³; metallized; Paper labels containing BPA, which can lose fibers and do not float
	Glues	9	Glues that are 100% removed at a test temperature of 70°C and leave no residue on the flakes	Water soluble glues (up to 80°C)	all other glues
Other	Supplements	10	No other components / additives desired; No materials with a density >1 g/cm³		PVC / PS / EPS / PU / PA (nylon) / PC / PMMA; thermosets, metals
	«Smart packaging»	11		various functions (see remarks)	
	Inserts / Inlays	12	No inserts / inlays	Inserts / liners made of HDPE / LDPE / PP, absorbent pads, air cushions, paper and cardboard; all inserts / liners should be completely removable	non-conforming absorbent pads

3.2 PET

Explanations to the Technical Guideline Plastic cups, trays, trays, blisters PET

Glossary	
In-Mould-Labeling (IML)	Process for applying inscription labels directly in the mold during molding.
Smart packaging	Expected future developments in the packaging industry, especially equipment with sensors.

Remarks	
1	No multi-material composites, whenever possible only mono-material packaging.
2	
3	Barriers are basically limiting; whenever possible, do not use barriers.
4	
5/6	Whenever possible, unprinted, completely removable lidding film / seal made of the same material as the main packaging.
7	Testing for EUPIA conformity is required.
8	Main packaging = cup, tray, tray or blister (without lidding film / seal); surface in the sense of the outer surface of the packaging
9	
10	
11	In the context of digitization, the field of «Smart packaging» brings new challenges in sorting and recycling, which must be examined on a case-by-case basis. Smart packaging: packaging with additional options. Active packaging that interacts with the contents. Intelligent packaging with e.g. diagnostic or indicator function or information, automation, marketing or protective function via sensors, barcodes, LEDs, NFC, loudspeakers, radio chips, displays, etc.
12	Absorbent pads in the LM-SB area - meat, poultry, fish: Absorbent or cushioning packaging pad for food products such as meat, poultry, fish in plastic trays or MAP trays, MAP trays.

3.3 PS

Status October 2020

Topic / Classification		Remarks	Material / theoretical recycling fulfilled	Material / theoretical recycling partially fulfilled	Material / theoretical recycling not fulfilled
Packaging	Material	1	PS		Composite materials
	Color	2	Natural, transparent clear or light transparent colors	dark transparent colors	Opaque and strong colors; Black (Carbon black)
Additives	Barriers	3	PET-based oxygen absorbers without yellow discoloration after EPBP oven test	PET-based oxygen absorbers with low yellow discoloration after the EPBP oven test	EVOH, PA; each other barrier; each other oxygen absorber
	Other	4	Surface coating with silicone (coating area only), «Antiblocking Masterbatch» (max. 3%); materials without influence on transparency (clarity)	UV stabilizers, AA-blockers, optical brighteners, oxygen absorbers, anti-static additives; materials with low influence on transparency (clarity)	Nanoparticle; Bio- / oxo- / photodegradable additives
Cover	Cap / Cover	5			
	Lid foil / seal printed (circuit board)	6	Lid film / seal can be completely removed by the consumer, no adhesive / glue residues when removing the lid film / seal; PS, PS with PE or EVA inlay, OPS, PBT / PS	Lightweight aluminum foil; PE; PP; PET / lightweight paper, metallized OPET and OPP	Heavy aluminum foil; PET / heavy paper; PET / PS
Decoration / Labels	Direct printing / printing ink	7	EUPIA-compliant (non-toxic); Only minimal printing (date, product no.), inks that come off in the recycling process (e.g. laser printing)	Large print areas as «label» goes out with peeling colors (e.g. laser printing)	Bleeding colors, toxic colors, dye-wash solution; colors that do not come off in the recycling process
	Labels / Sleeves	8	< 50% of the surface (main packaging); PS, PS / OPS (with the same density as the main material)	> 50% of the surface (main packaging); Paper (paper labels that do not decompose in the recycling process); In-Mould-Label	PVC, PET, metallization, paper labels that decompose in the recycling process
	Glues	9	Water soluble glues (at ambient temperature)	Water soluble glues (up to 80°C)	Non water soluble glues
Other	Accessories / Coatings	10	No other components / additives than the main plastic (PS) desired	Paper and cardboard (e.g. cardboard / plastic combination / wrapping)	PVC / PET / EPS / PU / PA (nylon) / PC / PMMA; thermosets, metals
	«Smart packaging»	11		various functions (see remarks)	
	Inserts / Inlays	12	No inserts / inlays	Inserts / liners made of HDPE / LDPE / PP, absorbent pads, air cushions, paper and cardboard; all inserts / liners should be completely removable	non-conforming absorbent pads

3.3 PS

Explanations to the Technical Guideline Plastic cups, trays, trays, blisters PS

Glossary	
Carbon black	Soot-based masterbatch (color) for plastics.
In-Mould-Labeling (IML)	Process for applying inscription labels directly in the mold during molding.
Smart Packaging	Expected future developments in the packaging industry, especially equipment with sensors.

Remarks	
1	No multi-material composites, whenever possible only mono-material packaging.
2	
3	Barriers are basically limiting; whenever possible, do not use barriers.
4	
5/6	Whenever possible, unprinted, completely removable lidding film / seal made of the same material as the main packaging.
7	Testing for EUPIA conformity is required.
8	Main packaging = cup, tray, tray or blister (without lidding film / seal); surface in the sense of the outer surface of the packaging
9	
10	
11	In the context of digitization, the field of "smart packaging" brings new challenges in sorting and recycling, which must be examined on a case-by-case basis. Smart packaging: packaging with additional options. Active packaging that interacts with the contents. Intelligent packaging with e.g. diagnostic or indicator function or information, automation, marketing or protective function via sensors, barcodes, LEDs, NFC, loudspeakers, radio chips, displays, etc.
12	Absorbent pads in the LM-SB area - meat, poultry, fish: Absorbent or cushioning packaging pad for food products such as meat, poultry, fish in plastic trays or MAP trays, MAP trays.

4. Current Partners of the Theme Platform

This guideline was created and is continuously updated by the theme platform 2 «Cups - Bowls - Trays - Blisters» of Allianz Design for Recycling Plastics.

Quotes

"Packaging is one of four strategic sustainability themes for Emmi. On the one hand, we want to reduce the consumption of packaging material in general, and on the other hand we want to use more ecological materials. In future, we are keen to use more packaging that can be recycled. Only by closing these material cycles we can comply with the «one-planet approach». For this reason, we welcome in principle the establishment of an HDPE recycling system, as long as this proves to be ecologically more sensible in an overall view.
In the field of packaging for dairy products, HDPE currently still has to overcome technical hurdles. They mainly concern the protection of the product from light and air. This must be ensured to avoid food waste. In cooperation with our packaging suppliers and other partners, we are trying to master these challenges and find future-oriented packaging solutions for our dairy products.

- Bendicht Zaugg, Head of Sustainable Packaging Projects Emmi Schweiz AG

"Swiss Recycling welcomes this pragmatic, voluntary implementation of the economy in terms of extended producer responsibility".

- Patrik Geisselhardt, Managing Director Swiss Recycling

"These guidelines create an excellent basis for returning the raw materials used for plastic bottles back into the cycle. The sustainability of packaging and the conservation of resources are among the goals of the SVI, which is why we have given our full support to this project".

- Andreas Zopfi, Managing Director Swiss Packaging Institute SVI

5. Best Practice Examples

Organic farm Zauner
rPET cups for dairy products
https://biohof-zauner.at/rpet-verpackung/

Pastry Shop Voland
Transparent cups made of recycled PET from Swiss production
https://www.pistor.ch/de/blog/Recycling-PET

Semadeni Plastics Group
Fertilizer bottle made of 100% recycled PET
https://www.semadeni.com/aktuell/showcase/detail/news/doppeltes-recycling-duenger-aus-urin-flasche-aus-rezyklat

MIGROS
Syrup bottle made of 100% recycled PET
https://generation-m.migros.ch/de/nachhaltige-migros/aktuelles/news-template/news/nachhaltigkeit/2019/migros-fuehrt-getraenkeflaschen-aus-recycling-pet-ein.html

mibelle GROUP / MIGROS
Cleaning bottle made of 100% recycled PE
Trigger bottle made of 100% recycled PET
https://www.mibellegroup.com/index.php/de/nachhaltigkeit/nachhaltige-innovationen/oekologische-verpackungen

ALDI SUISSE
Dishwashing detergent in bottles of 100% recycled PET
https://www.aldi-suisse.ch

Semadeni Plastics Group
Trigger bottle made of 100% recycled PET
https://www.semadeni.com/aktuell/showcase/detail/news/triggerflaschen-aus-100-rezykliertem-pet

Frosch recyclate initiative
Transparent Frosch bottles made of 100% old plastic
www.initiative-frosch.de/

Lush packaging
Use of 100% R-plastic in containers and bottles
www.agstg.ch/magazin/magazin-archiv/130-interview-mit-doris-trinkler-lush.html

Logo-Plastic Packaging
Use of 100% R-PET in standard PET conatiners
www.logoplastic.ch

All best practice examples can be found here
https://www.circular-economy.swiss/best-practice/

6. Appendix - Links

Association of Plastic Recyclers (APR)
www.plasticsrecycling.org/apr-design-guide/apr-design-guide-home

Technical Committee for the Recycling of Plastic Packaging (COTREP)
www.cotrep.fr/en/notices-and-publications/

Der Grüne Punkt
https://www.gruener-punkt.de/de/nachhaltige-verpackungen/ueber-design4recycling.html

European Printing Ink Association (EUPIA)
www.eupia.org

European Plastic Bottle Plattform (EPBP) Design Guidelines:
www.epbp.org/design-guidelines/products

FH Campus Vienna
https://www.fh-campuswien.ac.at/forschung/kompetenzzentren-fuer-forschung-und-entwicklung/kompetenzzentrum-fuer-sustainable-and-future-oriented-packaging-solutions/circular-packaging-design-guideline.html

List Hot Melts (EPBP)
www.epbp.org/download/297/eupr-positive-glue-list

Pictograms for the Swiss market:
www.swissrecycling.ch/dienstleistungen/piktogramme/

RecyClass
https://recyclass.eu/recyclass/design-for-recycling-guidelines/

Plastics Recyclers Europe (PRE)
www.plasticsrecyclers.eu/guidelines-packagings

Recycling Of Used Plastics limited (Recoup):
www.recoup.org/

Suez
https://www.suez.com/en/our-offering/businesses/what-are-you-looking-for/resources-management-consulting/circpack-together-we-make-your-packaging-recyclable

Swiss Plastics Dossier
www.swissplastics.ch/

Swiss Recycling Dossier
www.swissrecycling.ch/wertstoffe/kunststoff

WEF Report „The New Plastics Economy”
www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf