Design guide

How to design packaging for circular economy

The deposit mark is your guarantee for circular economy. It ensures, that single-use bottles and cans, are collected and recycled in an enclosed loop of the highest level into the new beverage packaging.

Circular economy starts with the good design. When you design considering the circular economic principles, you get a packaging, that is easy to recycle at the highest possible level, which benefits the environment – all the while, paying lower fees when the packaging is registered at Dansk Retursystem.

In this guide you can find information and knowledge, which will help you on your way.

From can to can and bottle to bottle

Dansk Retursystem operates one of the world's most circular economic loops for beverage packaging. The return rate and quality of the recycling is high, as the cans and bottles are recycled to the utmost extent. It is unique and environmentally optimal.

It starts with the design

There is a free choice of packaging in Denmark (You are free to choose the packaging for your product in Denmark), but as a manufacturer or buyer of cans and bottles, you can make a difference. Both for the environment and the economy. When the packaging can be easily melted down into new packaging, the costs associated with recycling are lowered for all parties.

The design reflects the fee you pay

At Dansk Retursystem, every packaging covers its own expenses. Calculations for the fee include the costs of collecting and sorting the packaging, just as the income from the sale of the recycled packaging material is deducted. A circular economic design, therefore, also gives a lower fee.

To help you on your way, we provide free access to our knowledge and experience on the subject. We update the information periodically, and you are always welcome to contact us with further questions and input.

How to design for circular economy

As a manufacturer or buyer of packaging with deposits, you are part of one the world's best material circuits. By following our recommendations, you are ensuring that precisely your packaging is among the most circular economic on the market. It is not just a good story; it is also responsible and sustainable.

This table gives some examples on how to design the packaging, so it is recycled more easily and therefore more circular economic. There are also examples of which design elements to avoid or minimize.

PLASTIC

Clear and transparent slightly light-blue plastic bottles of PET (polyethylene terephthalate) without a barrier layer, can easily be recycled to the highest degree into new bottles. Lids, cap and labels should be of other plastic types, to sort these more easily from the bottle and be recycled separately:

PET

	Choose:	**Avoid:**
Packaging material	Clear PET Transparent slightly light-blue PET	Colored PET (especially opaque. Other plastic types e.g., PVC, PLA, PS, PP composite (mix of materials, such as plastic/metals)
Barrier layer	It is best to avoid barrier layers. If absolutely necessary, choose types, that do not burden the recycling process. A Good choice is: SiOx plasma coating	Materials that burden the recycling process e.g., • Nylon (PA) • EVOH
additives		Avoid if possible, mixing additives into the plastic
Lid/cap/closing	PP or PE with density <1g/cm^3	Plastic types with a density>1g/cm^3 such as PVC and PLA Metal
Liner in lid	PE, PE+EVA, PP, and foamed PET, all with density <1g/cm^3	Plastic types with a density>1g/cm^3 such as PVC and PLA
Label/Sleeves	Sleeves/ labels with low or partial bottle coverage med of PE, PP, OPP, EPS, foamed PET, all with density<1g/cm^3	Full-body sleeves Foils and labels in plastic types with a density>1g/cm^3 (e.g., PET, PVC, PS and PLA) Metallized foils

		Foamed PETG
Inks	Choose inks without heavy metals and other problematic substances. Find more information at The European Printing Ink Associations https://www.eupia.org/	Inks which contain heavy metals and inks that dissolve in washing processes
Direct printing	Laser marked	Any other direct printing
Adhesives	Avoid glue if possible. If unavoidable, use an alkali releasable type at 60-80 degrees	Gluing the whole label onto the bottle

If necessary, read more about PET-bottles and design at https://www.epbp.org/design-guidelines

To conserve the earth's natural resources and support the development of circular economy, it is a good idea to use recycled PET in the manufacturing of new PET bottles. To protect the quality of food and beverages, when the bottles are recycled again, it is however important to only use recycled PET, that fulfills the necessary requirements. This means R-PET, sourced from a recycling process that is in accordance with *EU regulations on recycled plastic materials and articles intended to come into contact with foods (282/2008)*

Plastic bottles of HDPE (high density polyethylene) are currently not possible to recycle into new beverage packaging or other food-grade packaging. They are therefore recycled into other high-quality products and are best used if not colored:

HDPE

	Choose:	**Avoid:**
Packaging material	Uncolored HDPE	Colored HDPE Composite (mixture of materials)
Closing and lining	PE	PVC, PLA, PS and Metal
Label/Sleeves	PE	PVC, PLA and PS and metallized foils
Inks	Choose inks without heavy metals and other problematic substances. Find information at The European Printing Ink Associations https://www.eupia.org/	Printing inks that contain heavy metals Printing inks that dissolve in washing processes
Direct printing	Laser marked without colors	Any other direct printing
Adhesives	Avoid glue if possible. If unavoidable, use a water or alkali releasable type at 40 degrees	Glue which isn't water- or alkali soluble

If necessary, read more about HDPE bottles and design at https://recyclass.eu/recyclability/design-for-recycling-guidelines/ and http://bpf.co.uk/eco-design

GLASS

Glass bottles can be melted down into new ones, but the lid, cap or closing must be able to be sorted out.

Ceramics cannot be recycled, but must be crushed and reused for e.g., road fill or building blocks. If the ceramics are not sorted from the glass, it ruins the recycling of glass. Therefore, it is best to avoid ceramics altogether:

	Choose:	**Avoid:**
Bottle	Clear and transparent colored glass	Ceramics Composite (mix of materials) Surface-treated glass (e.g., metallization)
Lid/cap/closing	Metal or Plastic without hinge	Ceramics/porcelain cork Plastic cork attached with hinge
Label/sleeves	Sleeves/ labels with low or partial bottle coverage made of plastic or paper	Full-body sleeves Label made from PVC

METAL

Cans of aluminum (ALU) are capable of being recycled into new cans. Avoid the usage of other materials, as much as possible, as this can impair the overall recyclability. Also make sure to design the metallic packaging, so it can be compressed easily in the stores:

	Choose:	**Avoid:**
Can, lid and closing	Aluminum	Steel Plastic (e.g., closing mechanism) Composite (mix of materials) Glue
Coating on the can's inside and outside	Varnish/paint. Be mindful of keeping the ratio as low as possible, in regard to the recycling process	Plastic wrap/cover and sleeve Paper sleeves PVC Glue

NOTE

The information and advice found in this document, are meant for guidance purposes and are not exhaustive, as new materials and technology are regularly being developed. There can therefore be conditions or elements, that are not mentioned in the table. Dansk Retursystem strives to update information and guidance regularly. Have you encountered any incidents or have new knowledge? If so, we would like to hear your input.

If you have any questions or comments, you are welcome to contact Dansk Retursystem by telephone 4332 3232 press 3, or by mail: emballagetilmelding@danskretursystem.dk