Design for Recycling:

No regrets!

The journey to design your plastic packaging for recycling can begin today.

Background

- Moving towards harmonisation of Design for recycling guidelines over Europe under PPWR brings some areas of uncertainty in the process
- Fost Plus, Valipac, Verpact, Citeo, Green Dot Norway and NPA Sweden have worked together in this presentation to address these uncertainties.
- We have built together with the different EPR's mentioned and with the support of Emerging Motif a presentation that addresses these certainties and uncertainties. This can help you make decisions and be prepared in time for the deadline of 2030.
- This presentation was built based on the comparison of the CEN guidelines with the Recyclass and Cotrep guidelines

Disclaimer

- This document addresses the requirements of Article 6 of the EU Packaging and Packaging Waste Regulation (PPWR, Regulation (EU) 2025/40) on recyclable packaging. The PPWR places further requirements on certain packaging, such as minimisation, reuse and it contains market restrictions for certain single use plastic packaging applications. These topics are not covered in this document but will need to be considered by the designers and manufacturers of packaging.

- Please note: The official provisions and standards have not yet been published and are revised every two years. The European Commission is also working on an official FAQ and additional delegated and implementing acts, which may contain additional clarification or amendments. These documents have not yet been published. Regularly consult official EU sources and national guidelines for the most up-to-date information. Current information (presentations, memoranda, notifications, etc.) is solely our own interpretation of the currently available documents, but Fost Plus and Valipac are not liable for any inaccuracies or omissions, nor for the consequences of acting on their basis. For specific advice, we recommend seeking legal advice.

No regrets – you can start taking action for your packaging designs today!

Understand what design for recycling means, how it will likely be assessed in the EU, and what future requirements under the PPWR will be.

Understand your packaging design fully and obtain the necessary information on its exact composition (components, constituents) from your suppliers.

Understand which packaging category your packaging will likely fall into.

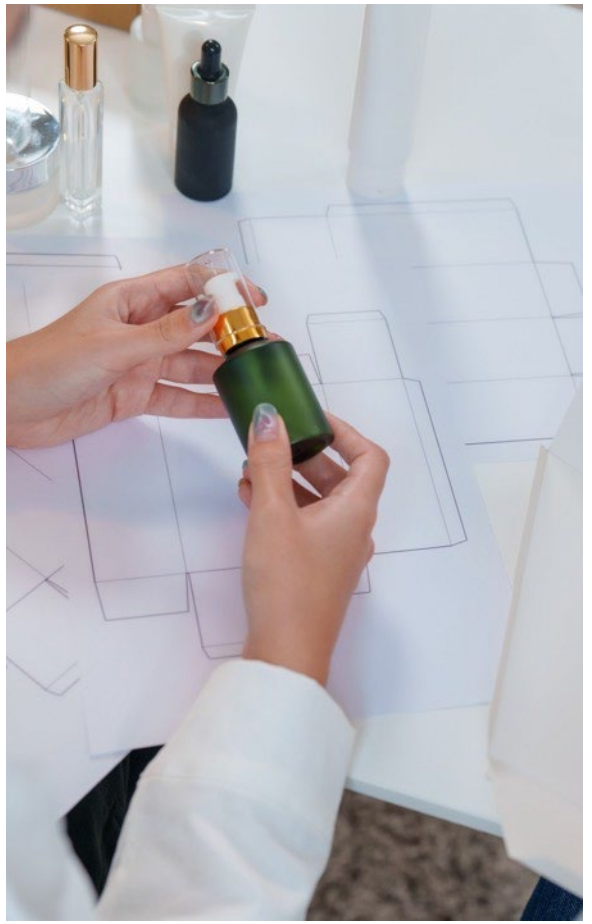
Consider the core design principles described in this document to be already well-prepared for the upcoming design-for-recycling requirements of the PPWR.

Get inspiration from best case examples and from problematic packaging examples provided in this document to start improving your packaging designs.

You can also reach out to Fost Plus or Valipac for further help and guidance.
www.fostplus.be or www.valipac.be

Design for Recycling

This section provides an introduction to the principles and importance of design for recycling, outlines the current status of design guidelines as well as European standards and criteria, and gives an outlook on future legal requirements.



What is **Design for Recycling** of packaging?

‘design for recycling’

means the design of packaging, including individual components of packaging, that ensures the recyclability of the packaging with established collection, sorting and recycling processes proven in an operational environment

[SOURCE: Regulation (EU) 2025/40]

‘recyclability’

means the compatibility of packaging with the management and processing of waste by design, based on separate collection, sorting in separate streams, recycling at scale and the use of recycled materials to replace primary raw materials

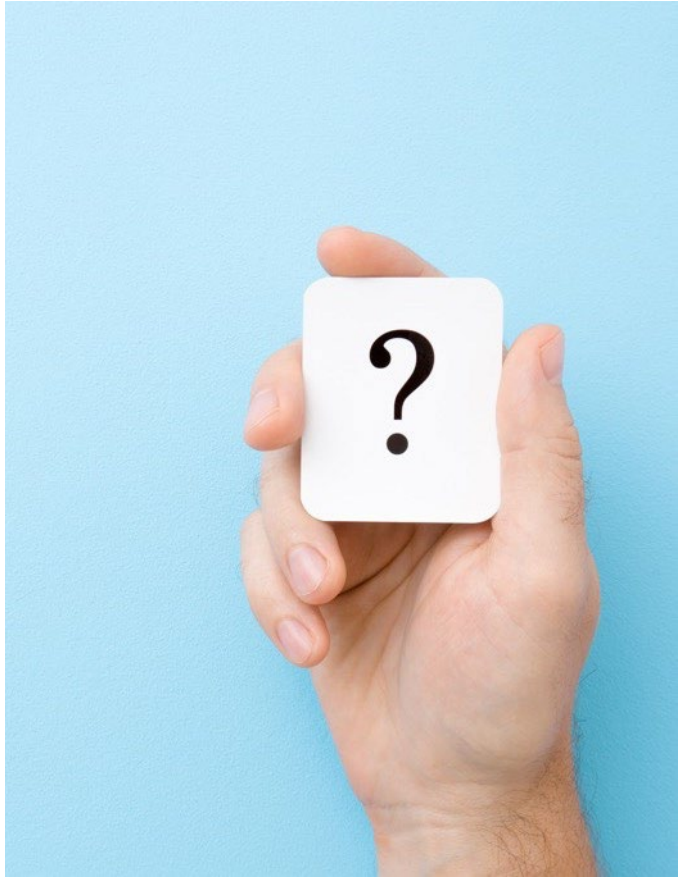
[SOURCE: Regulation (EU) 2025/40]

Design for recycling is a task for the designer of packaging.
It is about creating and ensuring the **potential** of packaging to be recycled.

Recyclability is a mission for the entire value chain to realise the **actual recycling** of designed-for-recycling packaging by 2035.

Why is Design for Recycling (DfR) important?

- Design for recycling enables the realisation of **environmental benefits** and supports the creation of a **circular economy** for packaging.
- **Consumers increasingly expect** that the products they buy come in design-for-recycling packaging.
- Design for recycling **reduces the cost of waste management**, **increases the value of recycled materials** and therefore **reduces EPR fees** that are paid by manufacturers.
- Design for recycling will become a **legal requirement in the EU** for most packaging from 2030 onwards due to the EU Packaging and Packaging Waste Regulation.



Regulation (EU) 2025/40 on Packaging and Packaging Waste Regulation(PPWR)

- The PPWR is a recent EU Regulation created as part of the EU Green Deal.
- It replaces the former Packaging and Packaging Waste Directive (PPWD) whose ‘essential requirements’ were considered ineffective in improving the sustainability of packaging.
- The PPWR covers nearly all packaging in the EU market, including items not intuitively considered as packaging, e.g., tapes, straps, protective films, certain liners.
- It applies from 12 August 2026 onwards, with several key requirements applying at a later date, e.g., in 2030, 2035 and 2038.
- The stated key aims of the PPWR include **reducing waste, promoting reuse and recycling,** and **increasing the use of recycled materials.**

Design for Recycling is one of the most prominent requirements of PPWR

NOTE: Certain packaging uses (e.g., certain medical packaging, packaging of dangerous goods) are exempt from certain of the requirements of PPWR. See the Regulation's text for details

NOTE: The date of application of the various requirements is not necessarily the fist of January of the stated year.

Design for Recycling is an obligation that is placed on ‘manufacturers’ by the PPWR

Article 15(1)

Manufacturers shall only place on the market packaging which is in conformity with the requirements laid down in or pursuant to Articles 5 to 12.

[SOURCE: Regulation (EU) 2025/40]

NOTE: There is substantial complexity to the designations of ‘manufacturer’, ‘supplier’ and ‘producer’ and more legal clarity is expected to be provided by the EU Commission in upcoming guidance.

‘manufacturer’

means any natural or legal person that manufactures packaging or a packaged product; however:
(a) subject to point (b), where a natural or legal person has packaging or a packaged product designed or manufactured under its own name or trademark, regardless of whether any other trademark is visible on the packaging or on the packaged product, ‘manufacturer’ means that natural or legal person;
(b) where the natural or legal person that has the packaging or packaged product designed or manufactured under its own name or trademark falls within the definition of micro-enterprise set out in Recommendation 2003/361/EC as applicable on 11 February 2025, and the natural or legal person that supplies the packaging to the natural or legal person that has the packaging designed or manufactured under its own name or trademark is located in the same Member State, ‘manufacturer’ means the natural or legal person that supplies the packaging

[SOURCE: Regulation (EU) 2025/40]

Verifying Design for Recycling under PPWR: the expected principle

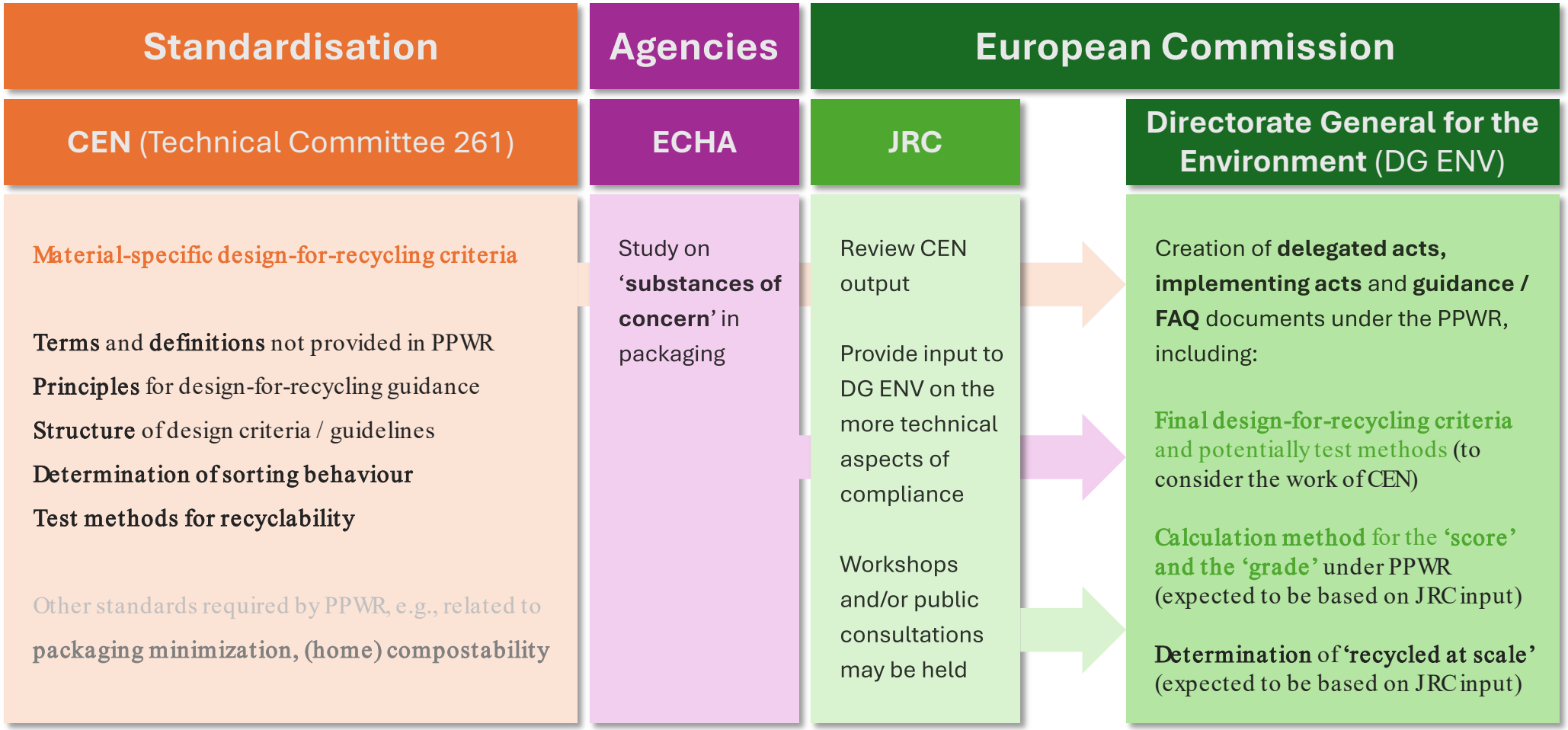
Know your **packaging design specification**	Determine the PPWR **packaging category**	Compare your design with **design-for-recycling criteria**	Calculate the **recyclability score**	Determine the **recyclability performance grade**

• A breakdown of all relevant components and constituents (incl. weights and thicknesses) will be required.
• Understanding of which components are separate, which are integrated will be required.
• The overall density of the packaging material will typically be required.
• Artwork information may be required.
	• The PPWR legal text contains an 'indicative list' of packaging categories in its Annex.
	• It is expected that this list will not change substantially.
	• The 'predominant material' in the main body of a package is expected to decide the packaging category.
		• The applicable DfR criteria depend on the packaging category (i.e., different criteria will exist per category).
		• The exact criteria will be defined in secondary legislation under PPWR, until 2028.
		• The PPWR legal text requires the Commission to consider in this task the outcomes of European Standardisation.
			• A recyclability score (in percent) will need to be calculated.
			• The score will take into account the design-for-recycling criteria.
			• How exactly the score will be calculated is not yet known
			• The exact method will be provided in secondary legislation under PPWR.
				• Each packaging will be assigned a grade, based on its score:
				  • ≥95% = A;
				  • ≥80 and <95% = B;
				  • ≥70 and <80% = C;
				  • <70% = not recyclable
				• A market restriction will apply for packaging that is 'not recyclable' from 2030 and for grade C from 2038.

Knowing the detailed composition of your packaging is an action you can take immediately.	**The current list already is a good indication of the future packaging category for your packaging.**	From early 2026, European standards for plastic packaging will be available and provide an indication of the future legal criteria.	More clarity is expected to emerge in 2026, as JRC and the EU Commission begin their work on this legislation.	Recycling at scale and the economic and environmental performance of recycling technologies may lead to a further modulation of the grade.

The principle of design-for-recycling verification is clear, but the detail is still being worked out.
While the calculation of the score and grade is still under development, design-for-recycling criteria are already becoming clear.

Who is working on providing the exact criteria and methods for design verification?



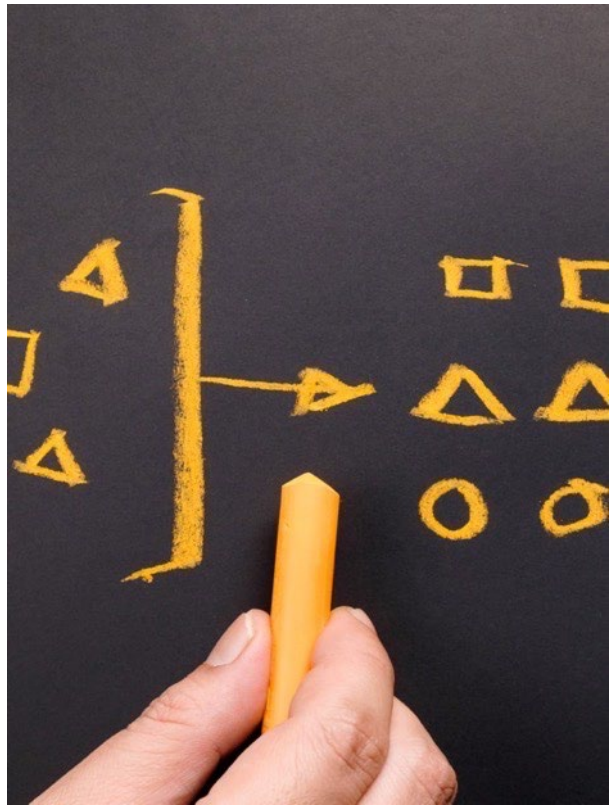
The role and importance of the work in European Standardisation

In 2022, CEN received a mandate to work on design for recycling of plastic packaging. (A follow up to work in the Circular Plastics Alliance, sponsored by the EU Commission).

CEN has worked to harmonise the many different design guidelines already published by various entities into a single European guidance for each packaging category (see Annex B of this document for an overview).

Additionally, CEN has worked to provide a strict, more formal and more elaborate description of how design guidance and criteria are to be derived, represented and applied. CEN has also created recyclability test methods with a focus on repeatability and reproducibility.

CEN standards are always developed with the consensus principle: what can be found in the final published standards has not been objected to by any significant part of the concerned interests. The CEN standards are therefore the most robustly developed documents on design for recycling to date, taking into account all concerned interests with equal weight.



The new CEN standards will provide substantial advances in clarity, harmonisation and robustness of design-for-recycling criteria. These standards (rather than other publicly available documents) are expected to form the basis of the work of the EU Commission.

The upcoming European standards are not the legal requirements of PPWR

PPWR does not call for the creation of harmonised standards for design for recycling; the standards can therefore not be used on their own to establish conformity with Article 6 of PPWR.

The EU Commission is instead required to consider the CEN standards when writing the secondary legislation for Article 6 of PPWR. As such, the future requirements of the legally binding secondary legislation under PPWR may differ in some areas from the CEN standards.

Until 2030, national legislation continues to apply for the design for recycling of packaging. The design guidance and criteria in the CEN standards may not match those of current national legislation. Users of the standards will therefore have to ensure complying with the prevailing national requirements until 2030.

It has to be considered that Article 6 of PPWR not only requires design for recycling but also contains requirements for 'recycled at scale' (from 2035 onwards). If the necessary infrastructure for recycling is missing, even well-designed packaging may receive a penalty in its recyclability performance grade. The CEN standards do not provide an assessment of 'recycled at scale'.

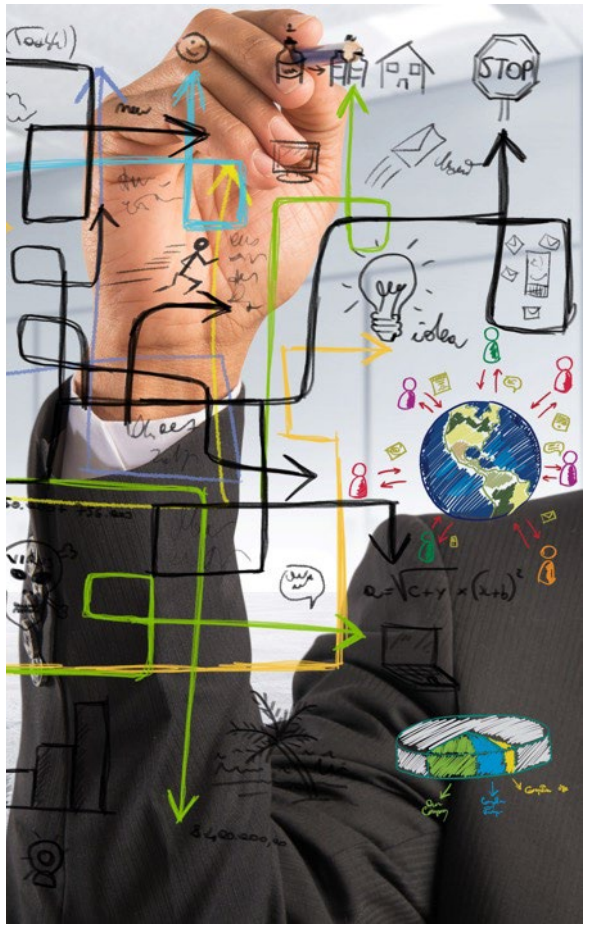
It is expected that the CEN standards will be updated and improved through revision at least once before the design-for-recycling requirements of PPWR start to apply in 2030.

The new CEN standards will provide detailed guidance. **However, the exact requirements of the secondary legislation for PPWR could still differ from the standards.**

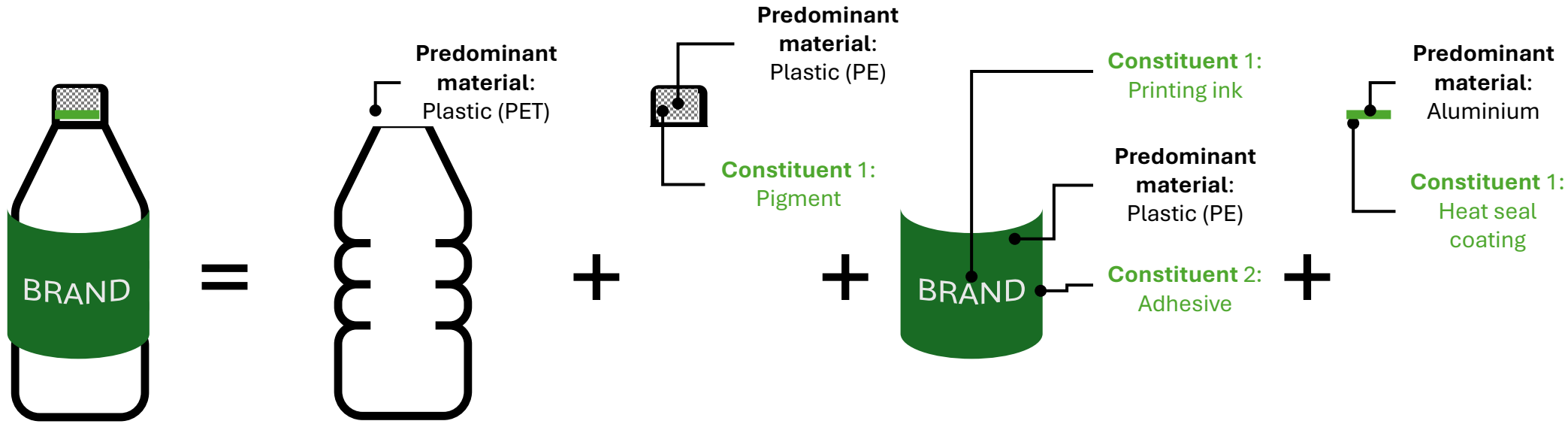
The question:

Do we Know Enough Today to Start on design for Recycling?

Yes! Enough detail has emerged already through industry guidelines, the work of CEN to harmonise these guidelines and via the PPWR legal text to confidently take decisions on packaging design that are at low risk of becoming invalidated when the final PPWR rules and requirements are published.



A clear logic for the design-for-recycling assessment, provided by the PPWR and the CEN standards



Packaging unit

Main body of the packaging unit
Bottle body (PET bottle, transparent clear)

Integrated component 1:
Cap (rigid PE)

Integrated component 2:
Label (flexible PE)

Separate component 1:
Seal (aluminium)

Apply the criteria defined for main body (PET bottles, transparent/clear)

Apply the criteria defined for the separate component (aluminium packaging)

You can already have good confidence in how the assessment of packaging will occur.

Choose a plastic type with a well-established recycling stream and clear design criteria

The most fundamental requirement of design for recycling is to design packaging so that a stream exists in which it can be recycled.

This means that there needs to be collection and suitable sorting infrastructure available to form such a recycling stream ('state of the art' principle).

Additionally, clear criteria need to be available to assess the design for recycling of packaging within a given stream.

The upcoming CEN standards on plastic packaging cover PPWR category 7, 8, 10,11,12,13,14,15, 16. They recognise that for these categories, at least one state-of-the-art recycling stream exists.

PPWR Category	Material
7	**PET – rigid bottles** (differentiated criteria expected for: clear/transparent light blue; transparent other colours; opaque white; opaque other than white)
8	**PET – other rigids** (e.g., trays) (differentiated criteria expected for: clear vs. coloured)
9	PET – flexible
10	**PE – rigid** (differentiated criteria expected for: natural colour vs coloured, and household vs. industrial/commercial expected)
11	**PE – flexible** (differentiated criteria expected for: natural colour, coloured, white and household vs. industrial/commercial expected)
12	**PP – rigid**
13	**PP – flexible** (differentiated criteria expected for: natural colour, coloured/white and household vs. industrial/commercial expected)
14	**HDPE and PP – crates, pallets and corrugated plastic board**
15	**PS and XPS – rigid** (differentiated criteria expected for: densities above / below 1; PS vs XPS)
16	**EPS – rigid** (differentiated criteria expected for: fish boxes, protective packaging)
17	Other rigid plastics (e.g. PVC, PC) including multi-materials – rigid
18	Other flexible plastics including multi-materials – flexible
19	Biodegradable plastics – rigid (e.g. PLA, PHB) and flexible (e.g. PLA)

PPWR category for which an EN standard has been developed

PPWR category for which no EN standard has been developed (technical specifications may yet be developed)

By choosing one of these materials for your packaging, you can minimise risks.
The future assessment of other plastic packaging categories (e.g., categories 9, 17-19) is less certain.

A clear expectation regarding the structure of design-for-recycling criteria and guidelines.

Based on the CEN standard drafts, design guidance and criteria are expected to follow a ‘traffic light’ approach (green/yellow/red).

Minor variants of this well-established approach may be used in the final approach to convey additional information or nuance.

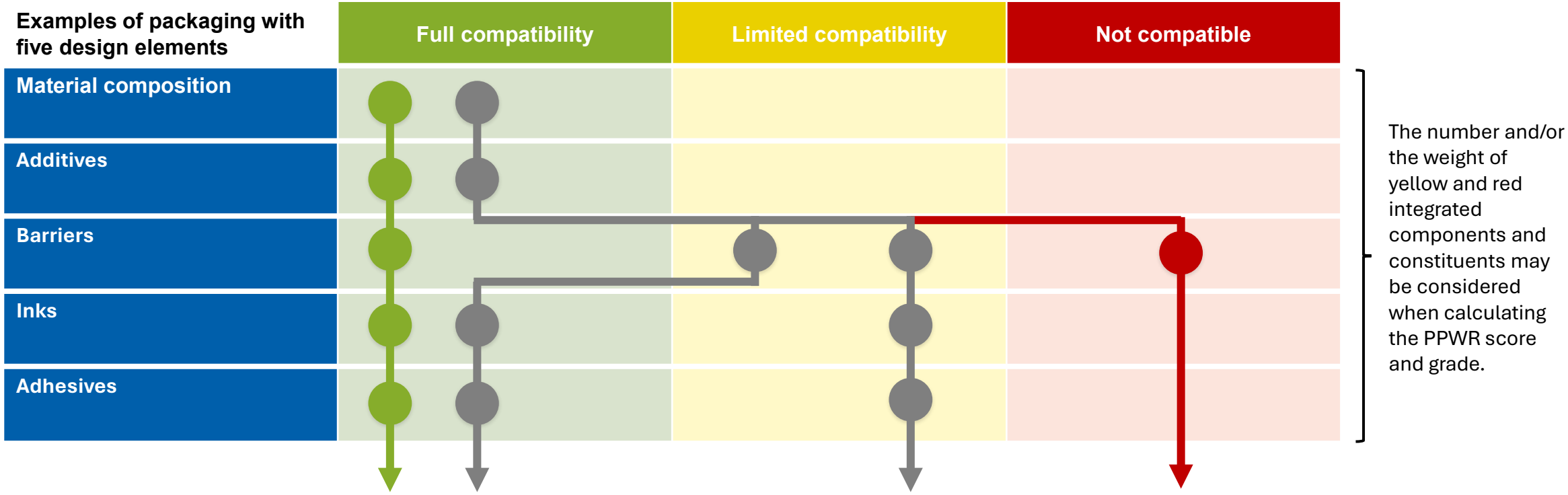
Alternate approaches, such as the use of ‘categories’ for integrated constituents and components appear less likely at this point.

	Full compatibility	Limited compatibility	Not compatible
Material composition			
Barriers			
Inks			
Laminating adhesives			
…			

In 2026, CEN will publish its series of standards on plastic packaging design for recycling,* which seek to harmonise the different industry guidelines that already exist.

*) The 2024 drafts of the CEN deliverables for plastic packaging can still be purchased through the national standards publishers. The final standards are expected for Q1-Q2/2026 already.

A clear expectation of a clear influence of yellow and red packaging design elements



All design elements in green:
Clear case that suggests a grade 'A' should be achievable
(assuming no significant losses)

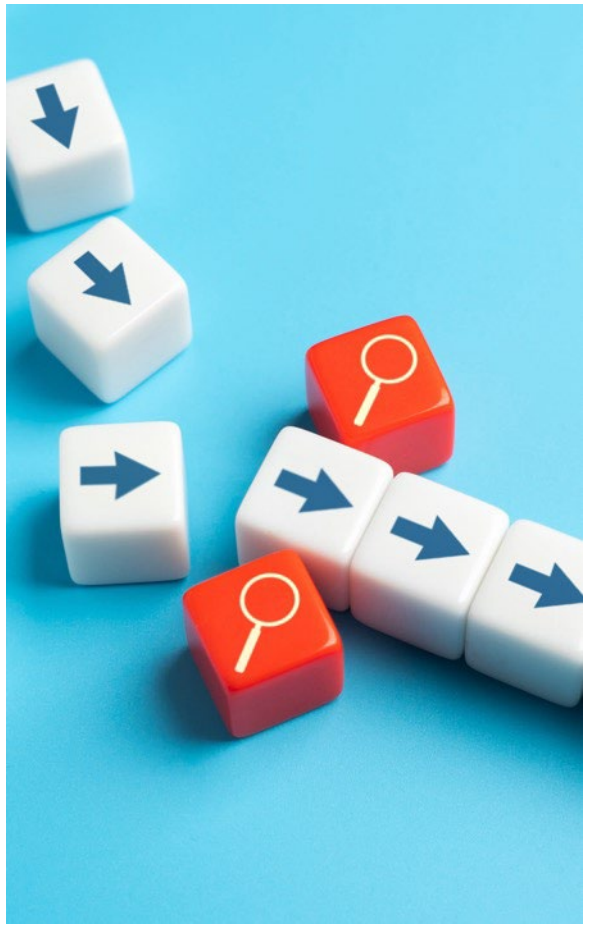
Mixed cases that will depend on how the score is calculated; a grade 'A' does not appear likely for all of these cases

Contains a red design element:
'Not recyclable' outcome is strongly expected; the packaging is expected face a future ban

While details of the score calculation are not yet known, avoiding red elements and minimising the number and amount of yellow elements is already a clear direction to follow.

Core Design Principles

This section provides already well-established principles that are contained in leading industry guidelines, have been adopted into the CEN standard drafts, and are firmly expected to be included in the final requirements of the secondary legislation under the PPWR.



Choose the materials of your packaging components according to established criteria that support recycling

If a packaging unit contains integrated components, these can be made from different material(s) than the main body.

Depending on their material, integrated components can support, impact or even prevent recycling of the entire packaging unit.

Integrated components should either be compatible with the recycling of the predominant material of the main body, or they should be removable from the main body before or during the recycling process.
(After removal, a separate recycling of the removed components is often possible.)

Clear design-for-recycling criteria have therefore been established regarding the choice of materials of integrated components. These criteria are specific to the packaging category / recycling stream and can be found in the respective design-for-recycling guidelines and in the upcoming CEN standards.

By choosing a material listed in green for your integrated components, you can already optimise your design.

Keep in mind that a ‘monomaterial’ approach is not always the preferred option for integrated components

The preferences expressed in industry guidelines and in the CEN standards for the materials of the different integrated components in packaging often do not follow a ‘monomaterial’ approach.

This is not accidental or a sign of ‘leniency’. Rather, a clever choice of different materials for the main body and the different integrated components can improve recyclability and the quality of recycled plastics.

For example, in the recycling of PET bottles, the main focus is on recovering as much PET from the main (bottle) body as possible, and at the highest possible quality. If the cap, which is often pigmented, or the label which is printed, were also made of PET, they would by default enter the PET recycling process. In contrast, PE or PP caps and lids are easily and readily removed after the bottle is shredded, since PE and PP flakes float on the surface of water while the PET flakes from the bottle body sink. This type of float/sink separation is already installed in essentially every PET recycling line.

Optimum recyclability is obtained by following design guidance (green/yellow/red), not by rigidly following a monomaterial approach.

Ensure that constituents of packaging are sufficiently compatible with recycling or can be removed in the process

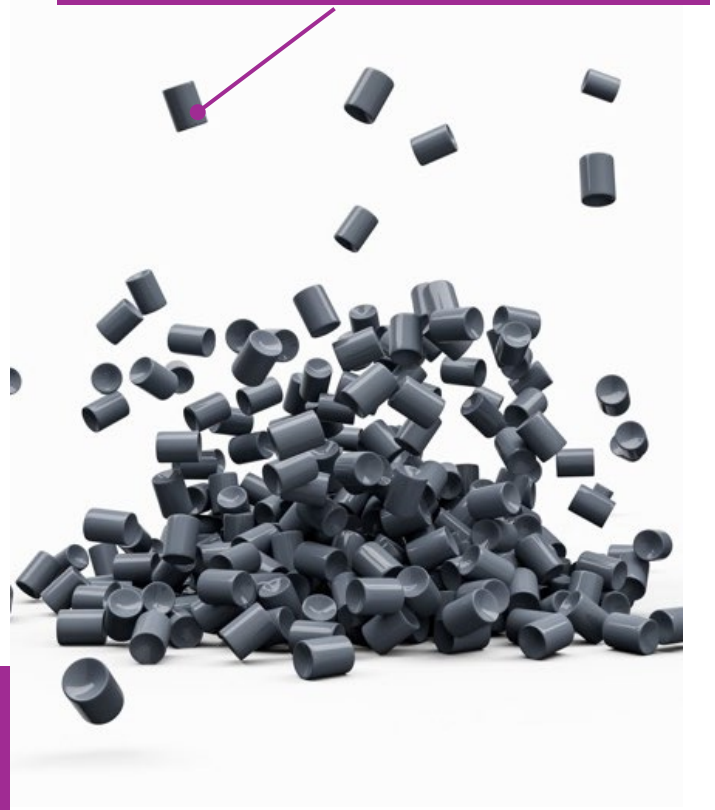
As for integrated components, the constituents of a packaging unit need to be either sufficiently compatible with recycling or sufficiently removable before or during the recycling process. This is necessary to protect recycling processes and ensure good recyclate quality.

To decide which constituents to use and which to avoid, design criteria give clear direction. Which constituents are considered red or yellow depends on the packaging category-specific criteria and guidelines.

Red-listed constituents should be rigorously avoided. There are generally alternatives which are at least listed as yellow, if not as green.

If yellow-listed constituents need to be used, their number and amount should be restricted to the necessary minimum.

Colour, odour and performance of recycled plastic directly depends on the compatibility of constituents



Nitrocellulose inks are under intense discussion, with different classifications and thresholds in different guidance.
Washable inks and their actual removal are still under discussion, particularly for household packaging.

By choosing constituents listed in green and minimising yellows, you can already optimise your design.

Use colour only where necessary; avoid mass coloration in favour of compatible labels and sleeves

Mass colouration (i.e., adding coloured pigments directly to a plastic) cannot be removed in most state-of-the-art recycling processes for plastic packaging. This means that a mass-coloured packaging will impart a colouration onto the recyclate.

Due to a mixing of various colours present in packaging, the recycling of mass coloured packaging leads to a grey/olive recyclate which is of much lower value and can be used for fewer applications than lighter colour or natural or white recyclates.

It is preferable, where possible, to avoid the mass colouration of plastics in packaging and leave packaging natural colour or use only a white pigment. Preference should be given to adding colouration through compatible sleeves and labels.

By favouring decorations over mass colouration, you can already optimise your design.

Avoid bleeding inks

When printing is present on plastic packaging (including on labels and sleeves), it is generally very undesirable if the printing inks 'bleed' into the water used in the washing steps before recycling.

'Bleeding' of inks means that the ink gets released from the plastic surface and dissolves or finely disperses into the process water. This is undesirable as it can be very difficult to remove bleeding inks from the water and this can affect both the colour of recycled plastics (as the inks can deposit again on the plastic flakes when the washing water is dried off) and the costs for the recycler (the water may require additional treatment before discharge to municipal wastewater).

Therefore, essentially all design-for-recycling guidelines for plastic packaging stress the important to avoid inks that bleed.

Note that washable inks (i.e., release from the plastic but in a form that they can be easily removed from the washing water) are different to bleeding inks. The use of washable inks is however still subject to ongoing discussion, particularly for household packaging.

By avoiding bleeding inks, you can help to improve the colour of recycled plastics.

Observe density thresholds for the different parts of packaging

In most recycling facilities for plastics, float/sink separation or centrifuges are used to remove unwanted materials before the actual recycling occurs.

Float/sink separation relies on the intrinsic density of certain plastic materials being above or below ca. 1 kg/dm^3. Lower density plastics float in water (e.g., PE, PP) whereas higher density plastics sink in water (e.g., PET). At the end of the float/sink process, only the floating or only the sinking material is collected and introduced into the recycling process.

Additives in plastics, notably pigments (including white pigments), as well as certain other materials such as barriers, inks and adhesives, can increase the density and, if used in large amounts, can cause a normally floating plastic to sink.

Foamed plastics exhibit a lower density than their intrinsic density. Foaming can therefore cause a normally sinking plastic to float.

Changing the intrinsic floating/sinking behaviour of plastics can lead to losses in recycling yields or contamination of recycling processes with unwanted plastic types and should therefore be avoided. Details can be found in the respective design guideline.

When adding pigments to plastics or using foamed plastics, observe established density thresholds.

*) PS is a special case as there are both low-density packaging uses (XPS, low density dairy packaging) and higher density applications.

Pay attention to design choices that can influence optical sorting of packaging waste

A key step before recycling of plastic packaging is sorting. Within the various sorting processes, automated *optical sorting*, especially by near infrared (NIR) sorters forms a key step.

NIR sorting is used to determine the type of plastic which is the predominant material of the packaging unit. Packaging waste is then generally sorted into a stream corresponding to the predominant material (e.g., PPWR categories 7 to 16).

Certain design choices, such as full-body sleeves can impact NIR sorting if they are made from a different material than the main body of the packaging unit. It is therefore important to ensure that such design choices consider sortability. Details and criteria can be found in the packaging category-specific design criteria and guidelines.

When integrating large integrated components made of materials different from the main body, consider sortability.

Minimise the use of constituents such as inks, coatings, barriers and adhesives

By following the core principles described above, the recyclability of packaging is optimised.

However, even when choosing only green-listed integrated components and constituents, there remains additional potential for further optimisation of packaging.

By reducing the amounts of inks, coatings, barriers, adhesives and other constituents to what is actually required for the packaging use case, the chances for a high PPWR recyclability performance score can be further optimised.

Even well-designed designed-for-recycling packaging can be improved further.

Call to action!

No need to wait – you can start to take confident action on your packaging designs today!

This document provides you with a starting point.

Contact your suppliers and discuss their understanding of the impact that their supplied materials and products may have on the technical recyclability of the overall packaging unit. You can also reach out to Fost Plus or Valipac for further help and guidance.

Examples

This section provides examples of packaging designs that are considered best in class. Their design elements are ranked consistently in leading industry guidelines and the CEN standard drafts. The section also contains examples of design choices that are generally considered problematic and should therefore be avoided.

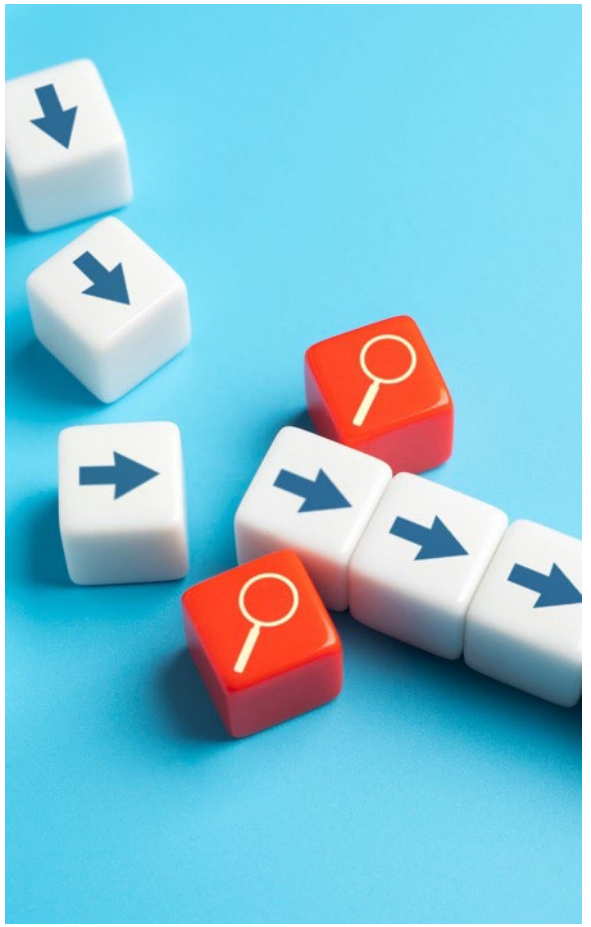
How were the examples in this document developed?

The examples in this document have been carefully selected to represent ‘no regrets’ choices that can be taken with confidence today.

They represent cases where strong consensus on the compatibility of the different design elements has already been achieved in industry. In particular, for household packaging, they were checked against the guidelines of COTREP, the EN 18120 standards drafts, and RecyClass. Where all three guidelines agreed on a green or red classification for a given design element, it is shown in the green or red column in the tables at the bottom of the examples. Where there was no full agreement between these guidelines, the elements are listed in the middle (grey) column.

Many other design choices are possible, but at this time, due to a lower level of consensus on their compatibility with recycling, their future status in design for recycling assessments is still less certain today.

NOTE: For each example, only the relevant design elements are discussed. For example, for cases where no particular barrier material is required, barriers are not covered. If additional design elements beyond the shown examples are being considered, checking them with the relevant guidelines is recommended.



Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• Design elements that are listed in green in COTREP, EN 18120 (draft) and RecyClass design guidance tables	• All other relevant design elements	• Design elements that are listed in red in COTREP, EN 18120 (draft) and RecyClass design guidance tables

Good Design Examples Consumer Packaging

A list of examples of packaging designs considered best-in-class today and expected to receive optimum recyclability performance grades under the future design criteria and rules of the PPWR.

Flexible PE laundry detergent pouch

Traditionally, stand-up pouches and gusseted pouches for detergent and household products have been produced as PET/PE laminates.

Today, with more recently developed ‘oriented’ PE films, it is possible to replace PET films and produce such packaging designs using only PE films.

For specific choices of the necessary adhesives and inks, there is already a solid agreement on good design choices. By conscious use of a limited amount of ink and adhesive, the design for recycling can be optimised.

Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• All films made from PE • < 3 wt% PU / acrylic adhesive • < 5 wt% of PU ink	• Nitrocellulose inks • Larger amounts of adhesives and inks	• PET / PE film combinations

Good design choices

Conscious use (limited coverage) of PU ink < 5 wt%

PU laminating adhesive < 3 wt%

Both film layers made from PE

PE pouch for refills, liquid soaps and detergents

Certain flexible packaging applications require special integrated components to facilitate their use, to provide reclosability or special functionality.

For example, a spout and a cap may be added to a flexible packaging to easily dispense liquids and to be able to reclose the packaging between uses. Other examples include zippers to reclose packaging (to prevent food waste), valves to protect filling goods (e.g., coffee) or other flexible or rigid closures (e.g., to dispense wet wipes).

By choosing the same material for such integrated components as the main body of flexible packaging, design for recycling can be optimised.

Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• All films made from PE • Closures made from PE • < 3 wt% PU / acrylic adhesive • < 5 wt% of PU ink	• Metallised PE • Nitrocellulose inks • Larger amounts of adhesives and inks • Other closure materials	• PET / PE film combinations • Aluminium foil barrier

Flexible PE cheese packaging

Packaging for dairy products such as (grated) cheese requires barrier functionality.

Traditionally, a range of different barrier materials have been used for flexible packaging. Design for recycling guidance agrees on a specific set of barrier materials as good design choices and agrees on certain barrier materials as bad design choices. However, there is no consensus yet on some barrier materials. Further discussion and testing of these materials is expected.

Where possible, by using one of the barrier materials with good agreement, chances for a high recyclability score can already be optimised.

Situation in industry guidelines and CEN draft standards

Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• All films made from PE • EVOH* up to 5wt%, AlOx, SiOx as barrier • < 3 wt% PU / acrylic adhesive • < 5 wt% of PU ink	• Metallised PE • Nitrocellulose inks • Larger amounts of EVOH • PA barriers • Larger amounts of adhesives and inks	• PET / PE film combinations • Aluminium foil barrier

*) coextruded, with a suitable compatibilising tie layer

Good design choices

Flexible PE baby food packaging

Traditionally, baby food food stand-up have been produced as PET/Al/PE laminates.

Today, with more recently developed ‘oriented’ PE films, it is possible to replace PET films and produce such packaging designs using only PE films. For aluminium foil, replacement with barriers such as AlOx or SiOx is an option.

Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• All films made from PE • AlOx, SiOx as barrier • < 3 wt% PU / acrylic adhesive • <5 wt% of PU ink	• Metallised PE • Nitrocellulose inks • Larger amounts of EVOH • PA barriers • Larger amounts of adhesives and inks	• PET / PE film combinations • Aluminium foil barrier

Flexible PP snack packaging

Snack packaging based on PP films is widespread and has traditionally been made with either a single or two layers of PP film.

Recyclability can be optimised by choosing a recycling-compatible adhesives and inks as well as barrier materials, where needed.

Limiting the amount of adhesive and print optimises the compatibility.

Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• All films made from PP • AlOx, SiOx as barrier layers • < 3 wt% PU / acrylic adhesives • < 5 wt% of PU inks	• Metallised PP • Nitrocellulose ink • Larger amounts of adhesives and inks • EVOH, PA barriers	• PET / PE film combinations • Aluminium foil barrier

Good design choices

Flexible PP pet food packaging

Traditionally, wet pet food stand-up have been produced as PET/Al/CPP laminates.

More recently, the option has been opened to use all-PP designs for this application, replacing PET film and aluminium foil with BOPP film and barriers such as AlOx or SiOx, respectively.

Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• All films made from PP • AlOx, SiOx as barrier layers • < 3 wt% PU / acrylic adhesives • < 5 wt% of PU inks	• Metallised PP • Nitrocellulose ink • Larger amounts of adhesives and inks • EVOH, PA barriers	• PET / PP film combinations • Aluminium foil barrier

PE sauce bottle with EVOH barrier

PE exhibits lower intrinsic barrier properties, e.g., against oxygen ingress or aroma loss, than for example PET. If a barrier is required, PE packaging needs to be modified with additional components or constituents that provide the barrier.

The use of certain amounts of EVOH, as in this example, has been agreed to be fully compatible with the recycling of PE rigid packaging.

By using a releasable PE label, the option is given to the recycler to separate the coloured label material from the main body of the packaging.

Such a sauce bottle could also be designed in PP with similar principles; however, a different level of agreement exists for the barrier material.

Situation in industry guidelines and CEN draft standards

Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• Bottle and closure made from PE • EVOH* as barrier (< 6 wt%) • Releasable PE labels	• Non-releasable labels • Releasable PP labels • Paper labels • Lighter metal closures / closure parts	• Heavier metal closures

*) coextruded, with a suitable compatibilising tie layer

Good design choices

PP trigger spray bottle

Certain rigid packaging applications require special integrated components to facilitate their application.

For example, cleaning products often require to be sprayed directly from the packaging. In these cases, a trigger head is typically added to the packaging as an integrated component.

By choosing the same material for such integrated components as for the main body of the packaging, design for recycling can be optimised.

Further optimisation can be achieved by refraining from mass colouration of the bottle and the trigger head and using minimal print and compatible labels.

Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• Bottle and closure made from PP • Releasable PP label • Metal-free trigger systems	• Limited amounts of metal in triggers • Non-releasable labels	• Larger amounts of metal in triggers

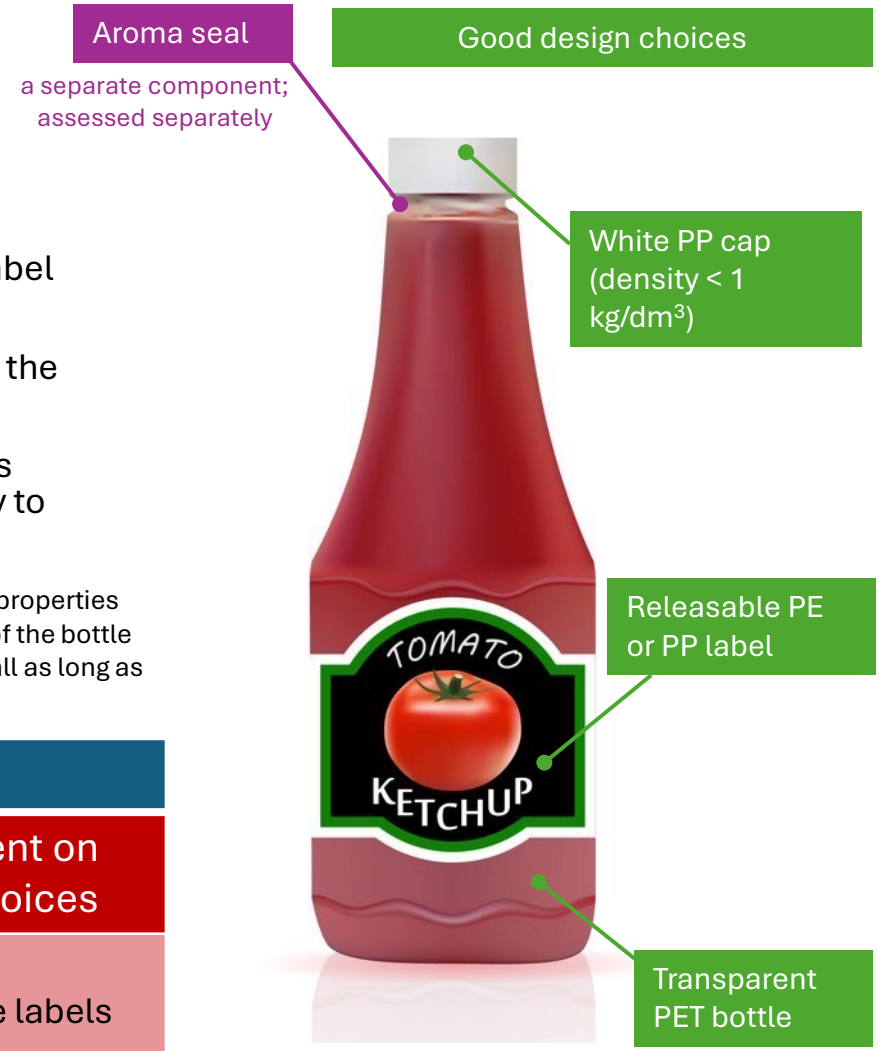
PET ketchup bottle with a sealing disc

The use of transparent and natural-colour PET and the use of a releasable PE or PP label leads to optimal PET recyclate quality.

The use of a floating cap material allows for easy separation of the cap material from the PET of the main body and for subsequent separate recycling of the cap material.

Where possible, the use of a seal that is recyclable should be considered. (The seal is expected to be considered a separate component and therefore assessed separately to the bottle)

NOTE: A multi-material sealing disc, which includes aluminium foil, may be needed to provide necessary barrier properties for this packaging. If the seal is considered a separate component, it is not expected to not disturb the recycling of the bottle (or the cap). It is expected that the impact on the PPWR recyclability performance grade of such seals will be small as long as their weight share in the overall packaging is sufficiently low.



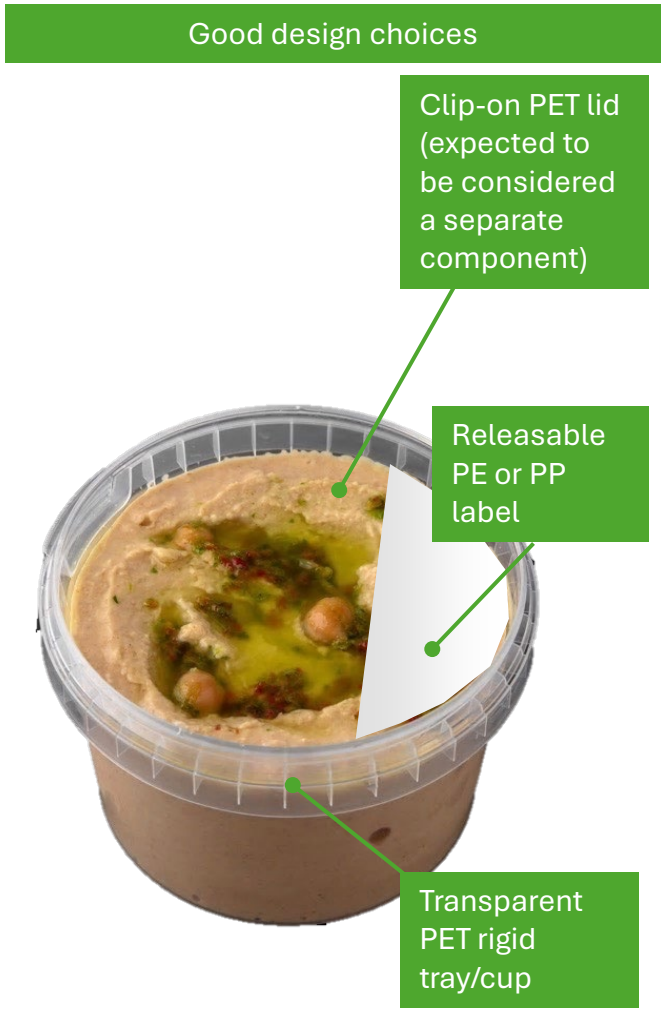
Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• Transparent PET for the bottle body • Releasable PE or PP label • PE or PP rigid closures (density < 1 kg/dm³)	• Paper labels	• Metal closures • Non-releasable labels

Transparent, natural colour PET rigid packaging with releasable label

Transparent and natural colour PET rigid packaging exhibits excellent recyclability.

Where a clip-on lid is sufficient, it is preferable, as the use of sealing layers, which may influence recycling, is avoided entirely.

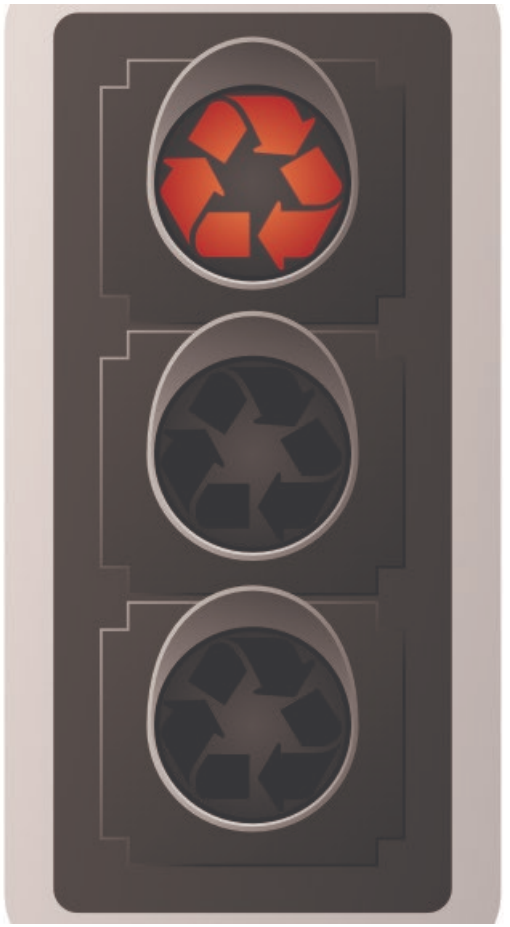
Avoiding direct print and instead using a releasable PE or PP label (which is readily separated by float/sink separation) retains the quality and colour of the recycled PET.



Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• monolayer monomaterial PET for cup and rigid lid • Releasable PE or PP label	• PET/PE laminated or coextruded material for cup and flexible lid • Paper labels	

Designs to Avoid Consumer Packaging

Examples of packaging designs considered problematic and/or contain components and constituents expected to result in low recyclability performance grades; some examples may not be allowed on the EU market after 2030 or 2038.



Avoid label or sleeve materials on PET bottles with a density > 1 kg/dm^3

The very well-established recycling of PET bottles relies on a separation of labels, sleeves, caps and other decorations from the flakes of the PET body by density (i.e., float/sink tanks or centrifuges)

Introducing such integrated components with a density of > 1 kg/dm3 would lead to them sinking together with the PET flakes and entering the PET recycling process, introducing colouration and potentially other negative effects on the recyclate

Decorations and closures of a density > 1 kg/dm3 should therefore be avoided for PET bottles.

Additionally, ensure that the coverage of PET bottles with labels or sleeves does not interfere with sortability.

Choose alternative sleeve material, e.g. PE or PP with density < 1 kg/dm^3

Situation in industry guidelines and CEN draft standards	
Solid agreement on bad design choices	Alternatives
Labels and sleeves with density > 1 kg/dm^3 on rigid PET packaging	Sleeve materials with a density < 1 kg/dm^3 (e.g., PE, PP) with ensured sortability, i.e., partial coverage

Avoid metal components, e.g., closures

Integrated components made of metal can cause substantial problems in the recycling of plastics and are very often mentioned in the red column of design guidelines.

Potential impacts include the dulling of shredder blades, the clogging of plastic extruder filters and the introduction of colour to recyclates.

Additionally, metal integrated components can lead to the packaging being sent to a metal recycling stream rather than the correct plastic recycling stream if they are substantial enough to influence magnetic sorting or eddy-current based sorting.

The use of metal components in plastic packaging should therefore be restricted to the technically required minimum.

Situation in industry guidelines and CEN draft standards	
Solid agreement on bad design choices	Alternatives
Metal closures of substantial weight in plastic packaging	Closures made from plastic materials preferred by design guidelines (green)

Avoid PET/PE and PET/PP laminates in flexible packaging

PET films have been used for some time in combination with PE and PP films in multilayer flexible packaging designs.

PET imparts desirable properties such as stiffness, puncture resistance, gloss, printability and facilitates reliability and productivity of packaging lines due to its forgiving nature in sealing operations.

Due to PET typically not being the predominant material, PET/PE and PET/PP flexible packaging is typically classified by NIR sorters as PE or PP packaging, despite PET being typically the outer layer. Such packaging is therefore generally sent to PE or PP film recycling.

It has been demonstrated that PET can cause substantial issues in flexible PE or PP packaging recycling. The use of PET as a layer in PE or PP-based flexible packaging should therefore be avoided in favour of suitable oriented PE or PP film.

Situation in industry guidelines and CEN draft standards	
Solid agreement on bad design choices	Alternatives
Combinations of PE or PP films with PET films	Use MDOPE, BOPE or BOPP films instead of PET film

Avoid the lamination of paper to PE or PP flexible packaging

It is possible to produce flexible packaging that is a combination of a paper layer and one or more layers of plastic films.

While paper imparts certain desirable technical properties (e.g., stiffness, dead-fold properties) and can be appealing to consumers, paper causes strong negative impacts on the recycling of PE and PP.

As paper is typically the outer layer in paper/PE and paper/PP laminates, such packaging is typically classified by NIR sorters as paper – based packaging.

As such, combinations of paper and PE or PP cannot be valorised in plastics recycling streams and should be avoided.

Choose as design that uses only PE films or only PP films (or only paper layers).

Situation in industry guidelines and CEN draft standards	
Solid agreement on bad design choices	Alternatives
Paper layers in predominantly PE or PP flexible packaging	Use only plastics or paper for all flexible plastic packaging layers

Avoid mass colouration with carbon black

Mass colouration of plastics with carbon black based or carbon black containing pigments can prevent them from being detected and classified correctly by NIR sorting devices.

This typically leads to a loss of the material from recycling when the packaging waste is collected from household sources.

Where a black colour of the packaging material is desired or needed, alternative black pigments, which are compatible with NIR sorting, should be chosen.

Situation in industry guidelines and CEN draft standards	
Solid agreement on bad design choices	Alternatives
Carbon black mass colouration	Non-carbon black pigments and dyes

Avoid all-over print with carbon black-based inks

The sorting of packaging waste with NIR sorters can be affected already by low amounts of carbon black. The amount contained in carbon black based printing inks is typically sufficient to impact NIR sorting.

While smaller features (text, lines, graphics, bar codes, QR codes, ...) are generally not a problem for sorting devices, a full coverage print with carbon-black based printing inks can prevent the correct sorting of the packaging.

If large areas of black print cannot be avoided, a non-carbon black based black pigment can be chosen or the correct sortability of the packaging should be empirically demonstrated.

Situation in industry guidelines and CEN draft standards	
Identified concerns	Alternatives
Full face printing with carbon-black containing inks	Limit coverage of carbon-black based print (small features, e.g., text, line graphics, bar codes, smaller graphics not an issue)

Exposed / visible metallisation

The sorting of packaging waste with NIR sorters can be affected by exposed (i.e., externally visible metallisation).

While smaller areas of exposed metallisation are generally not a problem for sorting devices, large exposed areas or completely unprinted / transparent films with metallisation can affect the correct sorting of the packaging.

The use of opaque films or printing of a sufficient share of the surface area with opaque print can mitigate these sorting issues.

Situation in industry guidelines and CEN draft standards	
Identified concerns	Alternatives
Leaving large parts of the surface exposed in the case of metallised films	Cover metallisation with an opaque film or print or choose an alternative barrier material

Avoid aluminium foil in flexible packaging unless aluminium is the predominant material

Aluminium foil provides excellent barrier properties, e.g., against oxygen, aromas, moisture, light. It has been used in flexible packaging for these properties for some time.

However, its propensity to be extracted by eddy current sorting devices and its behaviour in plastics recycling processes mean that it can negatively impact both the yield as well as the quality of recycling.

With the increasing availability of recycling-compatible alternatives, the use of aluminium foil in flexible packaging should therefore be avoided unless aluminium is the predominant material of the packaging, in which case it may be suitable for recycling in the aluminium stream.**

Situation in industry guidelines and CEN draft standards	
Solid agreement on bad design choices	Alternatives
Aluminium foil in predominantly PE or PP flexible packaging	Use alternative barriers such as AlOx, SiOx

*) Aluminium foil refers to the thicker actual foils made of aluminium and should not be confused with vacuum metallisation, which is an extremely thin coating of a plastic film with aluminium. The two materials behave significantly differently in sorting and recycling.

**) Correct sortability needs to be confirmed.

Good Design Examples Industrial / Commercial Packaging

A list of examples of packaging designs considered best-in-class today and expected to receive optimum recyclability performance grades under the future design criteria and rules of the PPWR.

Natural colour PE stretch film / pallet hoods

PE stretch film used in commercial and industrial packaging applications is today recycled successfully on a large scale. PE hoods used in commercial and industrial packaging applications are also recycled successfully on a large scale.

By refraining from the addition of pigments and reducing printing to the necessary minimum, design for recycling can be optimised, allowing the use of the recyclate obtained from commercial and industrial PE films again in the same application

Good design choices

Situation in industry guidelines and CEN draft standards		
Solid agreement on good design choices	No full consensus / still under discussion	Solid agreement on bad design choices
• Single PE films • Minimal print or laser marking • Natural colour / white PE labels with releasable adhesive	• Paper labels • Laminated multilayer films • Larger amount of print	

Intermediate bulk containers (IBC)

IBC with a PE container are today already often utilised in organised reuse/reconditioning systems, i.e., used multiple times before they are sent to recycling.

When reconditioning is no longer possible or the application demands a new bottle to be used, the steel cage and skid can still be reused.

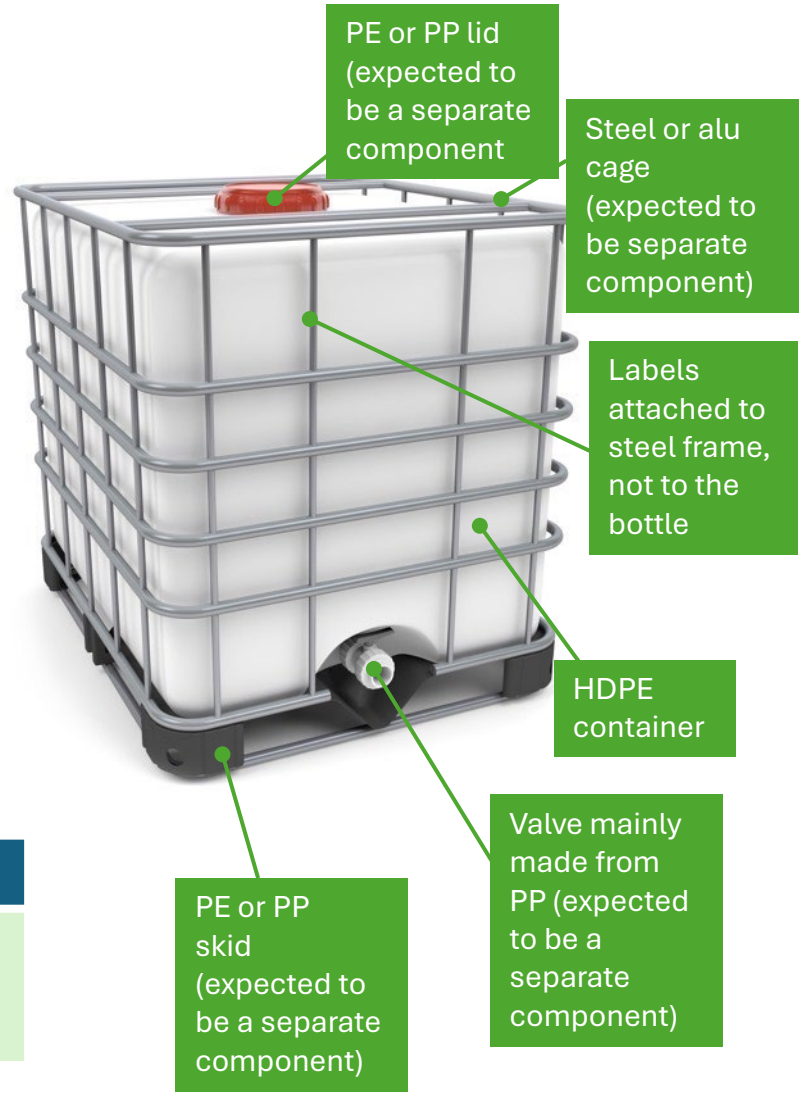
When being recycled, IBCs are selectively collected by specialised companies and standard operating procedures are in place to manually separate the bottle, the lid, the valve, the cage and the skid. Therefore, all these parts are expected to be considered as separate components under PPWR.

Each of the parts of an IBC can and is already being recycled today. This includes in some cases already a use of the recycled material from IBCs in new IBCs.

Situation in industry guidelines and CEN draft standards

As design guidance for purely industrial plastic packaging formats has been limited in industry guidelines, it is expected that the CEN standards will become the accepted guidance.

Good design choices



Flexible intermediate bulk containers / ‘big bags’

Flexible intermediate bulk containers (fIBC) are today already often utilised in organised reuse/reconditioning systems, i.e., used multiple times before they are sent to recycling.

The recycling of fIBC made from PP is already well-established today.

By choosing the main fabric, the sewing thread and the liner to all be made from PP, design for recycling can be optimised.

If a coating is used on the fabric, its compatibility with recycling needs to be considered.

Good design choices

Situation in industry guidelines and CEN draft standards

As design guidance for purely industrial plastic packaging formats has been limited in industry guidelines, it is expected that the CEN standards will become the accepted guidance.

HDPE drums

HDPE drums are selectively collected by specialised companies for recycling and standard operating procedures are in place to manually separate the clamping ring and the lid from the drum. Therefore, all these parts are expected to be considered as separate components under PPWR.

Due to the selective collection, the mass colouration of the drum is not a concern. Due to manual separation of the parts of the packaging, a black colouration of the lid with carbon black is not a sortability concern.

Each part can be and is already being successfully recycled today. This includes in some cases already a use of the recycled material from HDPE drums in new HDPE drums.

Good design choices

Situation in industry guidelines and CEN draft standards

As design guidance for purely industrial plastic packaging formats has been limited in industry guidelines, it is expected that the CEN standards will become the accepted guidance.

Strapping

As strapping is generally a simple design without many design elements, the key choice is the material of the strap.

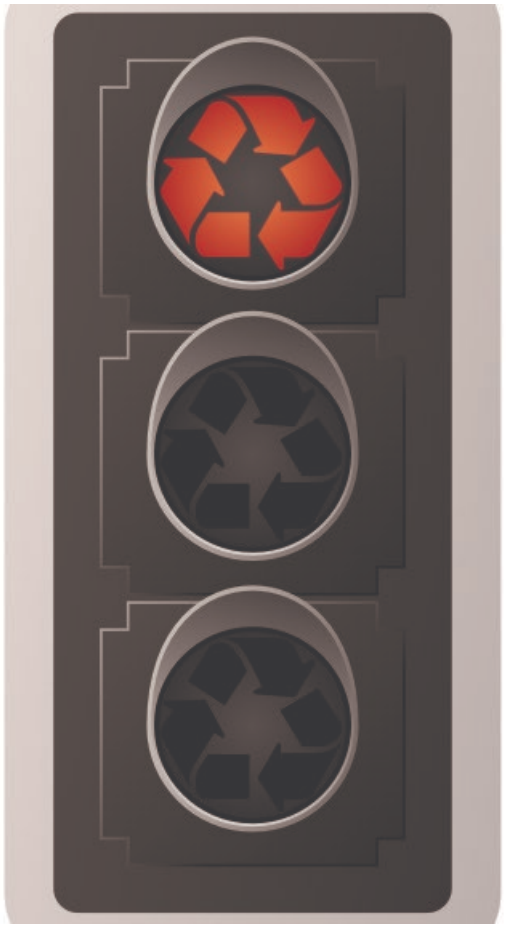
Strapping made of PET and PP is today already collected for recycling and being recycled. By preferring these straps over composite straps made of PET fibre embedded in a matrix of another plastic, design for recycling can be optimised.

Situation in industry guidelines and CEN draft standards

As design guidance for purely industrial plastic packaging formats has been limited in industry guidelines, it is expected that the CEN standards will become the accepted guidance.

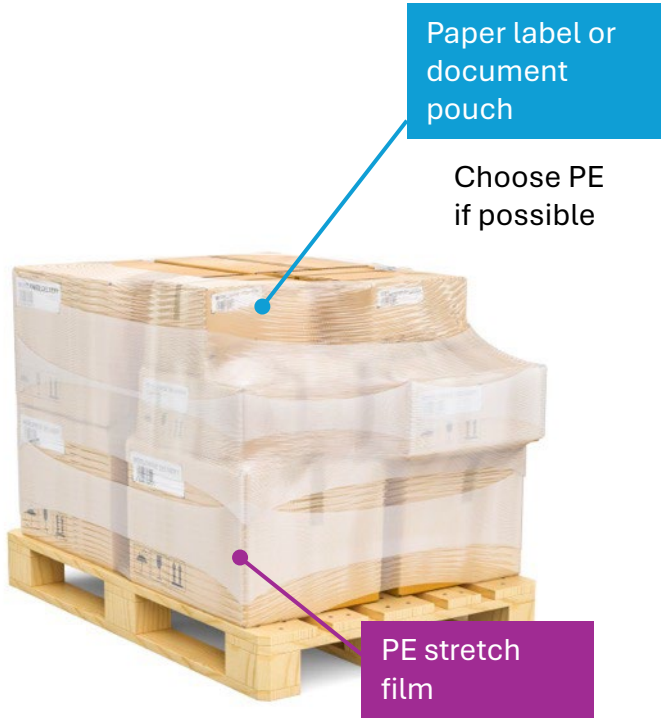
Designs to avoid
Industrial / commercial packaging

Examples of packaging designs that are considered problematic and/or contain components and constituents that are expected to lead to low recyclability performance grades; some of the examples may not be allowed on the EU market after 2030 or 2038.



Avoid paper labels and document pouches on wrapping film and shrink hoods

- Paper causes strong negative impacts on the recycling of PE and PP films
- In the case of logistics packaging, it is often necessary to make labels water (i.e., weather) resistant. This can lead to the labels not being removable during washing processes before the plastic recycling process.
- If labels need to be water-resistant, choosing labels made from the same material as the film (e.g., PE) avoids these concerns.



Situation in industry guidelines and CEN draft standards	
Identified concerns	Alternatives
Paper labels, especially those that are not water releasable	PE labels, with water-releasable adhesive

Annex A.
Key terminology

PPWR and CEN provide a consistent terminology for the different parts of packaging

The PPWR legal text also uses ‘packaging unit’ extensively. The leading understanding is that the two are synonymous.

‘unit of packaging’
means a unit, including any integrated or separate components, which as a whole serves a packaging function, such as the containment, protection, handling, delivery, storage, transport or presentation of products, and includes independent units of grouped or transport packaging where they are discarded prior to the point of sale [SOURCE: PPWR]

‘main body’
will be defined by CEN standards; expected to be the part of the packaging unit that has the highest mass share (with special rules for flexible packaging with heavy closures)

‘predominant material’
will be defined by CEN standards; expected to be the material with the highest mass share in the main part of the package (main body plus its integrated components and constituents)

main body
(the bottle)

unit of packaging
(predominant material: PET)

For terms used in PPWR but not defined within PPWR, it is expected that definitions from standardisation will be used.

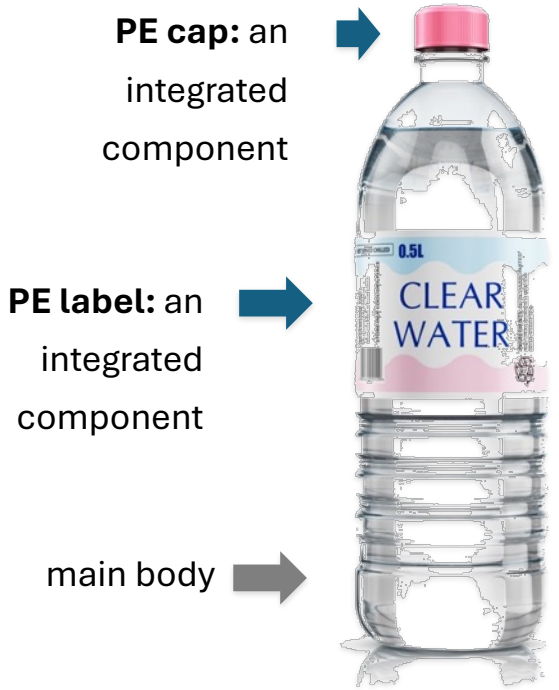
PPWR and CEN provide a consistent terminology for the different parts of packaging

‘packaging component’
part of packaging that can be separated by hand or by using simple physical means
[Source: ISO 21067-2:2015, definition 2.1.1]

‘packaging constituent’
part from which packaging or its components are made and which cannot be separated by hand or by using simple physical means
[Source: ISO 21067-2:2015, definition 2.1.2]

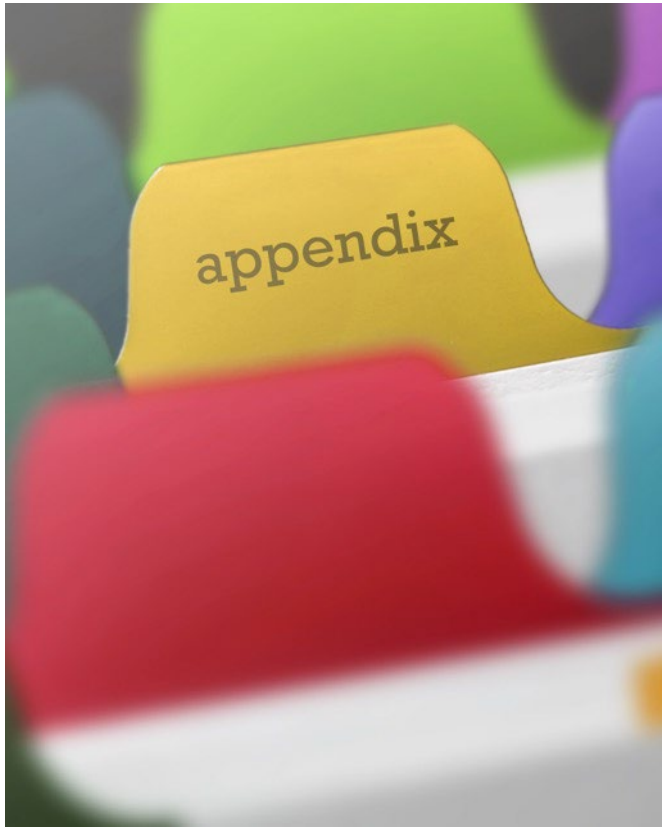
‘integrated component’
means a packaging component, whether or not of the same material as, or distinct from, the main body of the packaging unit, that is integral to the packaging unit and its functioning, that does not need to be separated from the main body of the packaging unit in order to ensure the functionality of the packaging unit and that is typically discarded at the same time as the main body of the packaging unit, although not necessarily via the same disposal route [SOURCE: PPWR]

‘separate component’
means a packaging component, whether or not from the same material as the main body of the packaging unit, that is distinct from the main body of the packaging unit, that needs to be disassembled completely and permanently from the main body of the packaging unit and that is typically discarded prior to and separately from the main body of the packaging unit, including packaging components that can be separated from each other simply through mechanical stress during transportation or sorting [SOURCE: PPWR]



For terms used in PPWR but not defined within PPWR, it is expected that definitions from standardisation will be used.

Annex B. References



European Standardisation – Plastic Packaging

1. **EN 18120-1**, Packaging — Design for recycling for plastic packaging products — Part 1: **Definitions and principles for design for recycling of plastic packaging**
2. **EN 18120-3**, Packaging — Design for recycling for plastic packaging products — Part 3: **Sortability evaluation process** for plastic packaging
3. **EN 18120-4**, Packaging — Design for recycling for plastic packaging products — Part 4: **Guideline** for **PET Bottles** packaging
4. **EN 18120-5**, Packaging — Design for recycling for plastic packaging products — Part 5: **Guideline** for **PET Rigid (except bottles) packaging**
5. **EN 18120-6**, Packaging — Design for recycling for plastic packaging products — Part 6: **Guideline** for **PE and PP rigid packaging**
6. **EN 18120-7**, Packaging — Design for recycling for plastic packaging products — Part 7: **Guideline** for **PE and PP flexible packaging**
7. **EN 18120-8**, Packaging — Design for recycling for plastic packaging products — Part 8: **Guideline** for **PS & XPS packaging**
8. **EN 18120-9**, Packaging — Design for recycling for plastic packaging products — Part 9: **Guideline** for **EPS packaging**
9. **EN 18120-10**, Packaging — Recyclability evaluation process for plastic packaging — Part 10: **Recyclability Evaluation Process for PET Bottles**
10. **EN 18120-11**, Packaging — Recyclability evaluation process for plastic packaging — Part 11: **protocols** for **PET rigid packaging (except bottles)**
11. **EN 18120-12**, Packaging — Recyclability evaluation process for plastic packaging — Part 12: **protocols** for **PE and PP rigid packaging**
12. **EN 18120-13**, Packaging — Recyclability evaluation process for plastic packaging — Part 13: **protocols** for **PE and PP flexible packaging**
13. **EN 18120-14**, Packaging — Recyclability evaluation process for plastic packaging —Part 14: **protocols** for **PS and XPS packaging**
14. **EN 18120-15**, Packaging — Recyclability evaluation process for plastic packaging — Part 15: **protocols** for **EPS packaging**

Will become available in early 2026 through the national standards publishers.
Note: the earlier drafts (dated from summer 2024) can already / still be bought as ‘prEN 18120-XX'.

European Standardisation – All Packaging

1. **Future CEN/TS** (CEN work item 00261543), Packaging — Design for recycling — Part 1: **Definitions and general principles of the process and design criteria to evaluate the recyclability of packaging**
2. **Future CEN/TS** (CEN work item 00261532), Packaging — Design for recycling — Part 2: Sortability evaluation process for packaging

Expected to be available from Q3/2026 through the national standards publishers.
No publicly available drafts before publication.

Public design-for-recycling guidelines

1. **APCO** sustainable packaging guidelines (link)
2. **APR** design guide (link)
3. **CEFLEX** Design for a circular economy guidelines (link)
4. **Consumer Goods Forum** Golden Design Rules (link)
5. **COTREP** guidelines (link)
6. **EPBP** design guidelines (link)
7. **FH Campus Wien** Circular Packaging Design Guideline (link)
8. **KIDV** Recycle Check (link)
9. **German** minimum standard (link)
10. **Petcore Europe / TCEP** guidelines (link)
11. **RECOUP / BPF** recyclability by design (link)
12. **RecyClass** design-for-recycling guidelines (link)
13. **UK** Recyclability assessment methodology (link)
14. **WPO** Global Packaging Design for Recycling Guide (link)

These guidelines are available via the provided web links.
A substantial overlap of the CEN deliverables with these guidelines is expected.