Netherlands Institute
for Sustainable Packaging
part of **verpact**

Background document

Recycle Check Flexible Plastic Packaging 2026



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Background document Recycle Check for Flexible Plastic Packaging 2026
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The Recycle Checks are updated annually. Check the website of the Netherlands Institute for Sustainable Packaging (KIDV) for the latest version.

For questions about a Recycle Check, please contact the KIDV.

The KIDV would like to thank the trade organisations, material and packaging manufacturers, manufacturers and importers of packaged products and sorters and recyclers for contributing to this Recycle Check. The KIDV has created this document with the utmost care and attention. Should the document nevertheless be incomplete or contain any inaccuracies, please let us know.

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Netherlands Institute
for Sustainable Packaging
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Part I:
Basic information

1. Introduction

The Recycle Checks (published since 2019) enable companies to relatively easily and quickly assess whether packaging is easily recyclable. In recent years, Recycle Checks have been published for rigid plastic packaging, flexible plastic packaging and packaging made of paper and cardboard, glass, metal, and beverage cartons.

The Recycle Checks are based on the current system of collecting, sorting and recycling packaging materials in the Netherlands. The processes examined are those used to process the largest tonnages of household waste stream: what happens to packaging after a consumer disposes of it at home and how is this (household) waste processed in the sorting and recycling plants? Local initiatives, market developments or innovations may affect the recyclability of packaging. The KIDV monitors these developments and changes in the market as closely as possible. The Recycle Checks are updated in close conference with the relevant chain parties if and when new developments apply to the majority of the packaging released on the Dutch market.

The Recycle Checks apply to packaging that is discarded as waste by households, offices, shops and the catering industry. The Recycle Checks are also used for packaging collected through the system for returnable packaging for which consumers have paid a deposit.

In the Netherlands, municipalities themselves determine how residents should dispose of their waste. Glass and paper/cardboard are separated at source. So-called PMD packaging (plastic, metal, beverage cartons) can be collected using source or post-collection separation.
With separation at the source, residents are asked to perform the initial sorting step themselves by discarding PMD separately in a bin or bag. Everything else is residual waste. Post-collection separation means that residents dispose of all their waste in the same bin or bag. After being collected by the municipal waste collection service, a specialist organisation further sorts the waste to separate material with recycling potential. Milieu Centraal's Waste Separation Tool is a handy tool to check in what bin each type of waste must be deposited.

1.1 The Recycle Check.

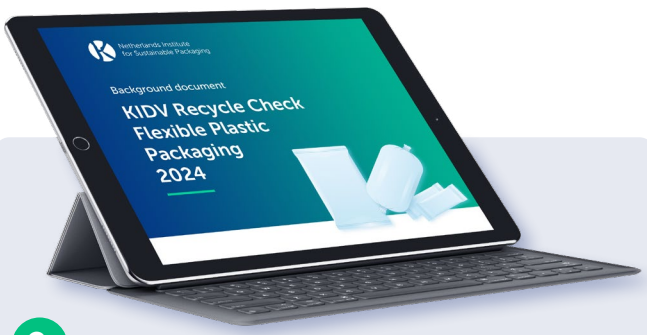
The Recycle Check consists of two parts:



1

The online Recycle Check checklist serves to assess the recyclability of the packaging (optimal, reasonable, limited or non-recyclable). The contents of the Recycle Check were updated in September 2025.

Optimal | Reasonable | Limited | Non-recyclable



2

The **background document**, consisting of two parts:

Part I: basic information about how to use the Recycle Check, definitions and concepts and information on determining disposable units. This part is the same for all documents.

Part II: material-specific information about collection, sorting, and recycling processes, as well as instructions on how to assess certain properties of packaging components. The background document can also be used as a source of reference with guidelines to improve the recyclability of packaging. The documents are available for the following materials:

- Flexible plastic
- Rigid plastic
- Paper / cardboard
- Glass
- Metal
- Beverage cartons

Part II starts on page 24.

The KIDV website also features **tools** to help you do the Recycle Check, such as Guidance on the Use of Recyclate, and guidance around determining colour. Also take a look at the **Packaging Glossary** for a list of the most frequently used terms and their definitions. These documents may be updated throughout the year.

1.2 Legislation.

The Recycle Check and accompanying documents take into account, wherever applicable, the European and national legislation in force at the time of publication. On 22 January 2025, the new packaging regulation, the Packaging and Packaging Waste Regulation (PPWR), was published. The specifics of this still need to be elaborated further, and it is expected that they will be announced in 2027. If the PPWR gives reason to do so, the Recycle Check will be adjusted. Further information about the PPWR is available on the **Verpact website**. This information will be updated throughout the year.

Essential Requirements

When placing packaging on the Dutch market, it must, at the time of writing, comply with the so-called **Essential Requirements** from the Packaging Management Decree ('Besluit Beheer Verpakkingen'). Please monitor the website for updates on this legislation.

The Essential Requirements stipulate that the environmental impact of packaging must be minimal. This is recorded in a product file, which must also include an explanation of how material can be recovered. The **KIDV Recycle Check** answers several of the questions from the associated standard. Use the results of the Recycle Check, as well as related specifications and other explanatory information, and add them to the product file.

The PPWR will also ask for such information, so it would be smart to start working on it ahead of time, so as to comply with current legislation and be well prepared for future legislation.

1.3 Food safety.

Food packaging may contain various chemical substances. When such packaging comes into contact with a product, substances from the packaging can migrate into the food. This may pose risks to human health. Some substances are prohibited (e.g. almost all PFAS), while other substances can be used under certain conditions (e.g. BPA). The KIDV offers various tools to support producers and importers of packaging and packaged products in assessing their packaging materials in this area. Please see the **food safety dossier** for more information.

1.4 Exceptions.

A number of product-packaging combinations may not be collected with household packaging waste because they can seriously disrupt the process, or cause unsafe situations. In this case, consumers can dispose of the packaging by an alternative route. The Recycle Check will then not apply.
There are two reasons why packaging should be collected separately:

- Packaging material creates problems in the process
- The product that was packaged in the packaging creates problems in the process

Packaging materials that cause problems

Most material streams contain packaging materials that may disrupt the sorting and recycling process, including the following:

- **EPS (polystyrene)** is difficult to process during the sorting and recycling stages, as the small static plastic spheres cause a lot of nuisance. Small EPS packaging such as cups and trays must be placed in the residual waste. Larger EPS crates and buffer material should be taken to a municipal recycling facility. The material can then be processed further by a recycler.
- **Wooden packaging:** there is no separate collection system for wooden packaging materials, such as wine boxes. Small wooden packaging can be disposed of with residual waste, and larger pieces should be taken to a municipal recycling facility.
- **Plastic (fruit) nets** often get stuck in the systems during the sorting of plastics. This causes them to disrupt and contaminate sorting systems. These nets must, therefore, be placed in the residual waste.
- **Ceramic, stone, and porcelain** are often deposited in bottle banks by consumers, which is not where they belong. These materials are not glass and are not collected as a separate stream in the Netherlands, but they go with the residual waste.
- **Bio-degradable** disposable units containing compostable plastics can have a major impact on recyclability, even if they end up in the mixed stream. The **Yes/No** lists for the separation of plastic, metal and beverage cartons at source state that compostable plastic packaging must not be disposed of with plastic, metal, and beverage carton waste. For more information, read the KIDV fact sheets on **bio-based** and **bio-degradable** packaging.

Product inside the packaging that causes problems

Small chemical waste consists of a list of hazardous substances that are released in small quantities from households, such as certain cleaning products, alcohol and medicines. Properly emptied packaging for medicines and small chemical waste may be disposed of with household packaging waste, but if the packaging is not completely empty, it and its contents must be disposed of separately via the recycling facility or pharmacy. This does not apply to empty buckets or packaging that once contained silicone, paint, latex, and cement; these should be disposed of with residual waste.

Clearly indicate on the packaging where the product may or may not be disposed of, so consumers do not dispose of the residual product via residual waste or flush it down the drain.

Example

An empty glass jar of skin cream or perfume bottle is not considered to be small chemical waste and may be disposed of in the bottle bank, while a jar that contains or contained a remnant of medication (e.g. antibiotics) does constitute small chemical waste and must be taken to a recycling facility or pharmacy.



Figure 1. Glass bottle containing medication

Milieu Centraal's Waste Separation Tool helps consumers figure out what bin to deposit the different kinds of packaging into. On www.recycleklaar.nl, you can check whether or not your packaging can be disposed of in the plastic, metal, and beverage carton (PMD) waste stream.

2. Recyclability and fee modulation

2.1 Definition of recyclability

The recyclability of packaging is partly determined by whether and to what extent it can be collected, sorted, recycled and reused. In addition, there are recycling targets for the various materials. While these are two different things, they are still related.

- **Recyclability** concerns the extent to which packaging or a disposable unit can be processed by the current system of collecting, sorting, and recycling, and how the raw material can be reused. Packaging can be non-recyclable, limited recyclable, reasonable recyclable or optimal recyclable.
  It is an assessment of the disposable unit that looks at how likely it is that the packaging will have an optimal passage through the recycling process, looking at the specific design of that disposable unit. As a basis for that assessment, the KIDV uses the definition given in the box below.
- **The recycling target** is a legal target that concerns the amount of material that must be collected, sorted and recycled after it has been placed on the market. For most materials, a larger percentage of packaging – of what has been placed on the market in the Netherlands – must be recycled each year.

Packaging must meet four basic criteria to be deemed to be recyclable:

1. The disposable unit must be made in such a way that it can be collected or picked up by approved waste collectors.
2. The disposable unit must be sorted and/or bundled into pre-defined streams for recycling processes.
3. During the recycling process, the material* is processed on an industrial scale** and is reclaimed into a raw material.
4. Recovered raw material has a uniform composition*** and is used to produce new packaging or products.

The extent to which these four basic criteria are met can be assessed using the Recycle Checks. A Recycle Check assesses whether the disposable unit is optimal, reasonable, limited or non-recyclable (see paragraph 2.2).

* *Depending on the material of the main component in the disposable unit, the amount of target material that can be recovered has to be above a certain minimum for the recycling process to make packaging highly recyclable, which is determined for each Recycle Check.*

** *Industrial scale means that more than half of the disposable units entering the market end up at recyclers and there is sufficient recycling capacity to recycle the sorted material within Europe.*

*** *Uniform composition means that the recyclate offers predictable and consistent quality as a new raw material and is used in a new product or packaging.*

The aim of the Recycle Checks is to help companies make their packaging (more) circular. The vision set out by the Ellen MacArthur Foundation serves as the basis for this endeavour:

> *'A circular economy is one that is restorative and regenerative by design and aims to keep products, components and materials at their highest utility and value at all times'*
>
> MacArthur, 2015

This commitment to circularity underpins the definition of recyclability developed by the KIDV, as mentioned above.

2.2 Categories of recyclability

In the checklist, we distinguish between optimal recyclable, reasonable and limited recyclable, or even non-recyclable packaging. The lowest score has the greatest weighting in determining the overall score. The coloured borders designate the following categories:

Non-recyclable
This qualification is used for packaging that contains a disruptor, i.e. materials that severely disrupt the recycling process and lead to the material stream being rejected.

Limited recyclable
Packaging that cannot be easily recycled because it, for example, ends up in the mixed stream (a mixture of various kinds of materials) after sorting. The material remaining after recycling has limited applications, because it contains components that (severely) disrupt recycling and are difficult to remove.

Reasonable recyclable
Packaging that requires an additional processing step before it can be classified as 'highly recyclable'. While this type of packaging does end up with the recycler as a homogeneous stream, there is something in its composition that somewhat affects the quality of the recyclate or the effectiveness of the process*.

Optimal recyclable
All properties of this type of packaging are optimally suited for recycling, making it 'highly recyclable' according to the aforementioned definition from the Recycle Check.

2.3 Fee modulation (for plastic packaging)

Are you required to pay a waste management contribution to Verpact? If you are, make sure you check whether your packaging qualifies for a **modulated fee**.

In 2024, Verpact introduced Fee Modulation 2.0, which incentivises highly recyclable **plastic packaging** and the use of recyclate. This applies to all packaging containing more than 50% plastic by weight that does not qualify for other fee reductions. A distinction is made between rigid packaging and flexible packaging, each of which has its own starting fee.

Plastic Fee Modulation 2.0 differs from its predecessor (in force since 1 January 2019) in that it also rewards minor improvements. There are four conditions that each entitle parties to a discount of 10 cents on the starting fee, and since 2025, a 20-cent discount for the use of post-consumer recyclate. One of the conditions is that packaging must have a 'highly recyclable' rating in the Recycle Check.

Innovative materials
Producers of innovative materials must be able to demonstrate that these materials can be collected and sorted in sufficient quantities and that they are compatible with existing industrial recycling processes or that new processes are available on an industrial scale. To coordinate innovative materials with fee modulation, the innovation trajectory for the plastic chain is in place. Verpact stimulates innovation in plastic packaging through a special programme within the Plastic Fee Modulation Regulation, which provides scope for new materials or production processes/techniques. The aim of this programme is to improve the recyclability, circularity and sustainability of plastic packaging and thus contribute to the objectives of Verpact's Plastics Guide. Please see **Verpact's website** for more information.

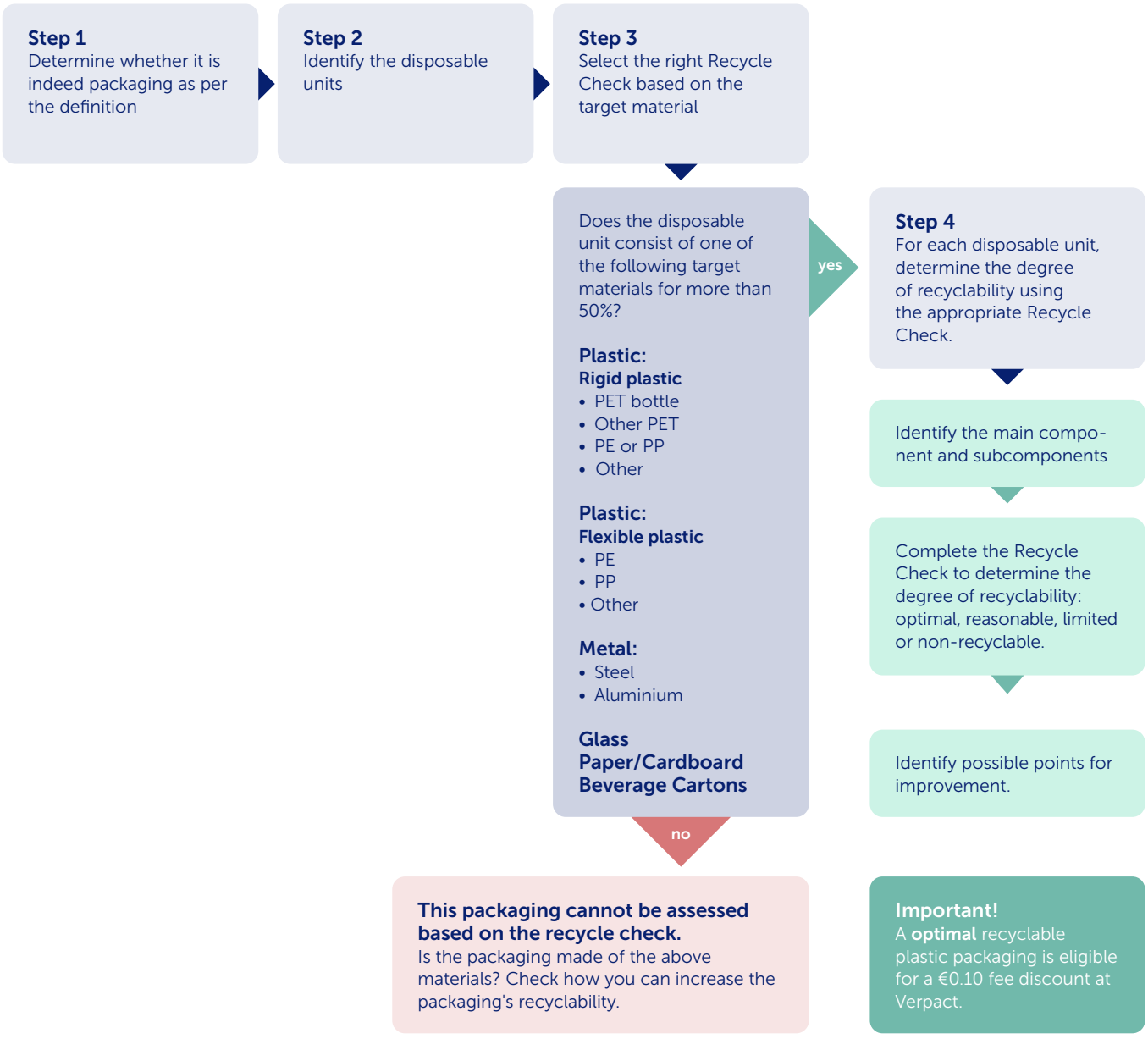
* The ideal composition of this stream varies per material and is explained for each material separately.

3. Select the right Recycle Check

The Recycle Checks were developed specifically to assess the recyclability of packaging. Packaging often consists of several different components, which may or may not be made of different materials, which users discard at different times. This affects the packaging's overall recyclability. The Recycle Checks first split packaging up into its constituent disposable units and then into a main component and subcomponents. To determine which Recycle Check(s) should be completed, it is important to first determine which disposable units the packaging consists of, and then to categorise these units by material. This section explains these terms and details the steps for choosing the right Recycle Check.

A preview of these steps is provided in the figure below, and they are further explained in the paragraphs below:

Figure 2. Select the right Recycle Check



Step 1. Determine whether it is indeed packaging

Recycle Checks can only return a reliable outcome for **packaging**. Therefore, it must first be verified that the object to be assessed meets the definition of packaging. The KIDV uses the following definition for that:

Packaging:
All products, made of materials of any kind, that can be used to contain, protect, ship, deliver and offer other products, ranging from raw materials to finished products, along the entire pathway from producer to user or consumer, including disposable items used for this purpose.

For the full definition of 'packaging', see Verpact's **policy document**. If in doubt about whether something does indeed constitute packaging, consult the (non-exhaustive) **Packaging Catalogue** on Verpact's website.

Step 2. Identify the disposable units

Most packaging is discarded in its entirety after use and is therefore considered a **single disposable unit**. Packaging that is not discarded in its entirety but as several separate components consists of **multiple disposable units**.

Whether different components or materials go through the sorting and recycling process together or separately can have a significant impact on recyclability. In practice, a single piece of packaging can consist of highly recyclable, moderately recyclable and poorly recyclable disposable units at the same time.

The KIDV goes by the principle that each packaging consists of a single disposable unit, unless:
- it consists of several unconnected components.
- part of the packaging must be permanently and completely removed in order to use the product.
- it features components, such as a lid, that can be detached by applying slight mechanical force

For some packaging, it is not always immediately clear whether it concerns one or more disposable units. A test is then required to determine how many units the packaging consists of. Some examples are elaborated below.

Packaging consisting of a single disposable unit

Table 1. **Single disposable unit**

Packaging that consists of a single piece of one material.	 Single disposable unit	***Example 1:*** *A cardboard box that is clean and dry can be disposed of with waste paper.*

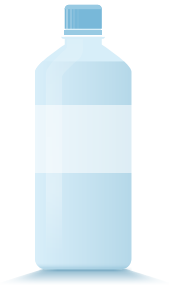
Packaging with fixed closure.



Single disposable unit

Example 2:
Glass packaging with a bracket closure are considered a single disposable unit because the bracket permanently connects the main component and lid. Even plastic bottles and beverage cartons currently often come with a permanently attached cap.

Packaging with bonded labels.



Single disposable unit

Example 3:
Labels glued to the packaging are considered subcomponents, and are not a separate disposable unit. Caps are not a separate disposable unit either, as they are generally screwed back on, and are, moreover, often attached to the bottle these days.

Packaging with multiple disposable units

There are several categories of packaging that consist of multiple disposable units. To clarify this, some examples are detailed below. Step 3 will further explain how to then choose the appropriate Recycle Check for each disposable unit.

Table 2. Multiple disposable units

Packaging consisting of several unconnected components.

The components are disposed of at different times.



Thirteen disposable units

Example 1:
A cardboard carrier tray that holds 6 small bottles. The cardboard tray and bottles each belong in a different waste stream. The crown caps on the bottles also constitute separate disposable units. So, what we have here are 13 disposable units made of 3 different materials.



Five disposable units

Example 2:
Cardboard box containing four bars, each wrapped individually in plastic wrappers. Users will take a bar from the box at different times/in different places. Therefore, the wrappers and the box are discarded at different times and places, and should be assessed separately with a Recycle Check.

Packaging with a component that must be permanently and completely removed in order to use the product

It should be possible to remove this part completely without tools (such as scissors) and without leaving any material residue.



Multiple disposable units

Example 3:
A cardboard sleeve around a plastic container. The sleeve has to be removed to open the container and access the product.



Multiple disposable units

Example 4:
A (champagne) bottle with a cork and a muselet (a wire cage that goes over the cork). These are three disposable units (bottle, cork and muselet) that go in different waste streams.

Further evaluation

There is also packaging that consists of multiple parts, which sometimes form separate disposable units and sometimes not. Further evaluation is needed to determine which disposal units the packaging consists of. A couple of examples are elaborated below.

Packaging with a component that does not necessarily have to be removed at all or not completely to be able to use the product.



Single disposable unit

Example 1:
Plastic flask with a paper sleeve that is, for example, held in place by the tapered design of the flask. The sleeve is not glued to the flask and does not need to be removed to be able to use the product. Packaging and sleeve make up a single disposable unit together, whereby the sleeve must be considered to be a label.

Short self-assessment

Sleeve detachment test

Some units of packaging feature a sleeve that is supposed to come off entirely when the packaging is compressed. This includes plastic cups with a perforated cardboard sleeve that is designed to detach when the cup is compressed. There is a protocol to test whether cup and sleeve indeed detach from each other and behave like individual disposable units. Called the Pollution and Compression Protocol, this protocol is available on the **protocols page** of the KIDV website.

Cardboard sleeve
If plastic packaging comes with a cardboard sleeve around it that consumers do not undo, but which has been shown to come loose during collection and sorting, the sleeve and packaging behave as individual disposable units. It must then be taken into account that in this case the cardboard sleeve will end up in the wrong sorting stream and must be considered non-recyclable.

The packaging features components, such as a lid, that can be detached by applying slight mechanical force.

There are types of packaging that have components, such as lids, that come off during the collection and sorting process, causing them to be processed as individual units during the sorting step.



Multiple disposable units

Example 1:
Margarine tub with a rigid lid. The lid comes off easily when subjected to minor mechanical force, meaning that it is an individual disposable unit in the packaging sorting process, even if the tub and the lid were originally discarded together.



Multiple disposable units

Example 2:
Cardboard tube with plastic cap. This lid comes off easily after being subject to minor mechanical force, becoming an individual disposable unit in the sorting process, even if the tube and the cap were originally placed in a bag or bin together as one whole.

Short self-assessment

Simple lid detachment test

You can test whether a lid detaches when slight mechanical force is applied by squeezing the empty packaging with the lid on. If the lid pops off completely, it is deemed an individual disposable unit.

Packaging with components such as a release liner



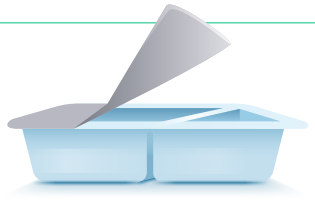
Multiple disposable units

Example 1:
Pouches/containers with ingredients in a ready-to-eat salad. These various individual components are separate disposable units and are discarded individually after use.



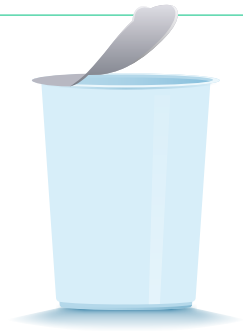
Multiple disposable units

Example 2:
A tamper-evident seal on the neck of a jar or bottle with a diameter of up to 40mm. The product cannot be used properly if the seal is not completely removed first. Used means that the product cannot be poured, spooned or dispensed, depending on the intended use of the container. Cap and bottle together make up one disposable unit, while the seal is a separate disposable unit.



Multiple disposable units

Example 3:
Plastic tray with release liner that must be completely removed to be able to use the tray's dispensing functionality.



Single disposable unit

Example 4:
Cups, trays with a wide neck, and trays where the release liner does not have to be detached completely to be able to use the product are also considered single disposable units. The liner can even be used to reseal the packaging.

Short self-assessment

Simple release liner detachment test

You can test whether a release liner detaches when slight mechanical force is applied by grabbing the open, empty packaging by the release liner and shaking it. If the foil comes off easily, it is deemed an individual disposable unit. At the start of the test, at least 25% of the release liner must still be attached to the rest of the packaging.

If there is doubt as to whether packaging consists of one or multiple disposable units, and the above examples do not provide clarity, please contact us using the **KIDV Q&A**.

Step 3. Categorise the disposable unit or units

The Recycle Check involves completing an individual checklist for each disposable unit. For each unit, determine the most common overarching and, if applicable, specific **material type** (see list below) to categorise the unit. The type of material that makes up at least 50% of the unit's weight determines what category the unit falls into. This is also referred to as the **target material**, see Section 4.

If none of the types of material make up more than 50% of the disposable unit, the disposable unit cannot be assessed using a Recycle Check. The packaging should then be adapted (see also paragraph 1.2 on legislation in this document).

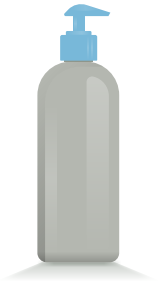
The types of material:

- **Rigid plastic**
  - PET bottle
  - Other PET (incl. PET trays)
  - PE or PP
  - Other rigid plastic
- **Flexible plastic**
  - PE
  - PP
  - Other flexible plastic
- **Metal**
  - Steel
  - Aluminium
- **Glass**
- **Paper/cardboard**
- **Beverage cartons**

To illustrate this, some examples are detailed below.

Example 1:
A hand soap container. The soap comes in a luxurious metal bottle with a plastic pump. The pump cannot be easily removed from the bottle. It is determined that the bottle and the pump make up one disposable unit, as explained in step 2. Only one checklist needs to be completed in this case, choosing steel packaging because more than 50% of the disposable unit is made of steel.

Figure 3. Hand soap container



Example 2:
A granola bar wrapper. The bars come in individual wrappers and are packaged with four in a box. According to the explanation in Step 2, it is determined that this packaging consists of five disposable units: the box and the four wrappers. To assess the packaging, a checklist must be completed for each disposable unit. In this case, choose a checklist for the cardboard box and a checklist for the flexible plastic wrappers. For several of the same disposable units, such as four identical wrappers, one checklist is sufficient.

Figure 4. Multi-packaging



In case of doubt as to what category a disposable unit falls into, please contact us using the KIDV Q&A.

Step 4. Determine the degree of recyclability

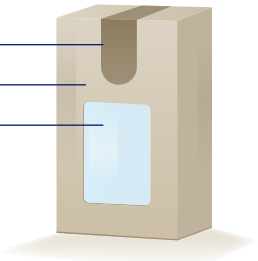
After choosing the appropriate Recycle Check to assess the recyclability of the disposable unit, the next step is to identify the **main component** and any **subcomponents**.

The main component of packaging is that which holds the product, and usually the component that makes up most of the packaging's weight. Besides its main component, a disposable unit often also has one or more subcomponents. These are added components, such as labels and closures, which are processed along with the main component in the recycling process.

The table on the next page shows some examples of how to identify the main component and subcomponents. More information on each material type is available in the material-specific background documents.

Table 3. **Determining main and subcomponents**

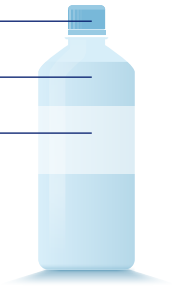
Subcomponent = tape
MAIN COMPONENT = box
Subcomponent = window



Single disposable unit

Example 1
Box (main component) with window and tape label (subcomponents).

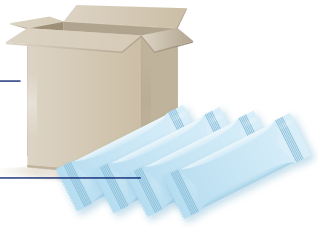
Subcomponent = closure
MAIN COMPONENT = bottle
Subcomponent = label



Single disposable unit

Example 2:
Flask (main component) with cap and label (subcomponents).

MAIN COMPONENT = box
MAIN COMPONENT = wrappers



Five disposable units

Example 3:
Box (main component) with 4 granola bar wrappers (also main components).

If there is any doubt about the difference between the main component and subcomponents of the disposable unit, and the above examples do not provide clarity, please contact us using the KIDV Q&A.

4. Target material and secondary material

What is the target material?

The target material is the material that will ultimately be recycled into a new raw material. Typically, this is the **most common material** in the disposable unit, often the material of the **main component**.

Exceptions: if a subcomponent (such as a heavy steel cap) is heavier than the main component, the subcomponent is the target material.

If a subcomponent **is made of exactly the same material** as the main component (e.g. paper label on a cardboard box or PE cap on a PE bottle), this counts towards the target material. Properties such as colour, additives and printing of these subcomponents must be taken into account in the assessment.

When does packaging have sufficient target material?

The target material must constitute at least 70% of the total weight of the disposable unit:

Target material weight / Total weight of the disposable unit x 100% ≥ 70

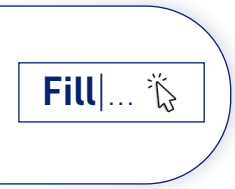
Secondary stream

Materials that are **not the target material** form the **secondary stream**.
These can affect the processability of the target material, but can also be recycled themselves if properly coordinated (design for recycling).

Example: returnable bottles made of PET with caps and labels made of PE or PP. The caps can be easily separated from the PET and can themselves be easily recycled as a secondary stream.

In **Part II**, you will find the material-specific information that goes with the checklist. See Section 6 of Part I for more tips and tools for sustainable packaging.

5. Manual for the checklist



Step 1: Creating packaging

Open the Recycle Check dashboard, add the packaging and fill in some information about the packaging being assessed and click 'Save' at the bottom of the page.



Step 2: Creating the disposable units of the packaging

Click the play button that says 'Edit packaging'. Click the green button for an explanation of how to identify disposable units. Next, add the disposable unit or units that make up the product-packaging combination. Each disposable unit of the packaging must be assessed separately.

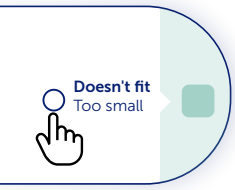
Step 3: Completing the checklist

Go through the corresponding checklist for each disposable unit by clicking the 'Start checklist' button. Upon opening the checklist, general information is provided that can be clicked away after reading. The questions include links to additional explanations for each material in the background document.



Step 4: The final score

Once all checklist questions have been answered, the 'Complete' button at the bottom of the list leads to the summary page, which gives you the final recyclability score for the disposable unit. The heading 'Final Score' shows how many questions from the checklist have already been answered. For example, if it says 8/10, then the checklist consists of ten questions and eight have been answered. As soon as the full list has been filled in, the box with the tick turns the colour that matches the checklist outcome (**optimal**, **reasonable**, **limited** or **non-recyclable**). If the packaging consists of multiple disposable units, proceed with the next checklist.



Important: data are saved locally while you are completing the Recycle Check. If you close the checklist when you are halfway through completing it, you can continue from the same computer at a later time; the previously entered details will still be there. You can only complete the list on another computer if you download the entire portfolio (see step 5).



Step 5: Saving and sharing results

The summary page offers the option to export the results to a PDF file using the 'Download PDF' button. If the packaging assessed consists of multiple disposable units, the checklists for all units of each packaging are included in one PDF export.

Tip: An empty Recycle Check can be downloaded by entering the packaging and adding a disposable unit, while not starting the checklist. When downloading a PDF, the checklist will be displayed as an empty list.

In addition, there is the option to download the entire portfolio, consisting of all completed checklists, so that, for example, a colleague can upload the entire set on their computer. You can do this by clicking the 'Export packaging' button in the top-right corner of the dashboard. This will download a .json file. An entire set can then be imported by clicking 'Import packaging' and uploading the .json file here.

Some checklists use this symbol to mark questions as complex. This means that it is more difficult to determine the right score in one go (**optimal**, **reasonable**, **limited** or **non-recyclable**). In these cases, you can usually perform a test to see whether your packaging qualifies for a higher level of recyclability. For example, it may be necessary to perform a test in order to answer one of these questions. Two scores are possible for these types of questions. The Recycle Check automatically ticks the lowest score. After a positive test result, the higher score may be ticked. However, it is important to have proof of a positive test result on hand. Where possible, references to available protocols are provided; in some cases, such protocols have yet to be developed. For updates on this, see the KIDV's **protocols page**.

Tip: Answer all questions first and determine if a test can improve the final score. Some criteria later in the checklist mean that a positive test result will not result in an improvement in the final score of the check. For example, when a test has to do with a disposable unit's sortability and it does not score optimally on recyclability to begin with. Of course, it may still be wise to perform the test to gain more knowledge about this particular aspect.

If you want to up your sustainable packaging game, the KIDV's **7 tips** will get you off to a good start. This section will further explain what other information and tools the KIDV has available to help you get started with sustainability.

6.1 Disposal Guide

The **Disposal Guide** makes it easier for consumers to dispose of packaging waste the right way. Research shows that there is strong support among consumers for separate collection, but they need to know which bin to put their waste into. Disposal Guide logos on packaging encourage consumers to put the packaging into the right waste stream after use so that it can be optimally processed and recycled. The logos are available
from the KIDV on request.

6.2 E-learnings and training

Sustainable packaging is so much more than just changing or reducing the amount of packaging material. To provide guidance on this, the KIDV has developed a number of e-learnings:

- **Packaging recycling in the Netherlands**
  Using real-life examples, the KIDV provides insight into the collection, sorting and recycling of different kinds of packaging. This e-learning module covers every packaging material: rigid and flexible plastic, glass, metal, and paper and cardboard.

- **Plastic packaging sorting and recycling processes**
  To add further depth to the 'Packaging recycling in the Netherlands' e-learning module, the KIDV has developed this more technical module. This module further explains the basic techniques used to sort and recycle plastic packaging, going into things such as the influence of packaging design on the various sorting and recycling processes.

- **Five perspectives on sustainable packaging**
  When developing successful sustainable packaging, several aspects must be taken into account. Consider the packaging process and logistics, for example, as well as customers' purchasing and disposal behaviour and the company's packaging and sustainability strategy. The **Five perspectives on sustainable packaging® KIDV model®** covers the main approaches. This model allows you to zoom in on issues of importance in specific situations from any angle, with background information, tips and examples that can help you on your way. In this e-learning module, the KIDV shows people how to use the model, using real-life examples and assignments that apply specifically to their own packaging practices.

- **R-strategies**
  The next step is turning the opportunities and threats into actual actions, such as redesigning your packaging. The so-called R-strategies are strategies that can be applied to make packaging or a product-packaging combination more sustainable. This e-learning module goes into the specifics of using the R-strategies through real-life examples and assignments.

Training programmes

In addition to the e-learnings, the KIDV offers **training programmes**, with packaging experts introducing participants to both the theory and practice of sustainable packaging. This kind of training adds value in that it lets participants practise using the theory under the guidance of a packaging expert. There are also opportunities to ask in-depth questions and to network with other businesses. The knowledge and skills gained during this training can subsequently be harnessed in formulating your own packaging sustainability strategy and applying practical tools in your own practices.

6.3 Further information

The KIDV website features fact sheets, publications, and tools on various topics in the sustainable packaging domain. A few of them are presented below.

Fact sheets

- When can a company put an environmental claim on its packaging and when is it being made falsely and potentially misleading to consumers? The KIDV has prepared the **Environmental Claims Fact Sheet** on this subject, describing the legal frameworks for these claims, using some common examples.

- Bio-based and bio-degradable packaging materials can often help reduce CO_2 emissions and reduce demand for fossil resources. At the same time, whether these materials are a good alternative also depends on the product being packaged. For more information on these materials, their potential and the issues involved, see the **Bio-Degradable Packaging and Bio-Based Plastic Packaging Fact Sheet**.

- The KIDV's **Symbols on Packaging Fact Sheet** provides an overview of logos that consumers may find on packaging, as well as their origin and meaning and whether their use is mandatory or voluntary.

- The KIDV has put together a comparison of the use of **Disposal Guide logos on packaging in different European countries**. This overview makes it clear to companies which logos are used in those countries, whether that is voluntary or mandatory, and where companies can find information about the regulations that apply there. The KIDV also manages the **Dutch Disposal Guide**.

Dossiers

Take a look at the KIDV's dossiers to gain insight into the latest developments, get practical examples and read about focus points in making packaging sustainable. The dossiers are specific to sectors or industries and to relevant topics around sustainable packaging, such as chemical recycling and reusable packaging. Click **here** for the dossiers.

- What legislation (directly) affects the design of packaging and the reuse or disposal of packaging waste after use? The KIDV has plotted information on laws and regulations on a **clear timeline**. The timeline contains background information and links to the specific legislation itself.

- Manufacturers and/or importers that place packaging on the Dutch market are responsible for ensuring that their packaging complies with the so-called '**essential requirements**'. These pertain to the composition and nature of the packaging to minimise their volume and weight and ensure they are suitable for reuse and recovery of the materials.

- Packaging affects consumer behaviour when they purchase, use and discard products and their packaging. Sustainable packaging can, therefore, also contribute to sustainable consumer behaviour. Read more about **consumer behaviour** here.

- How consumers interact with packaging also partly determines the sustainability of packaging. Based on scientific research on consumer behaviour, the KIDV has compiled an overview of key insights. The **Sustainable Consumer Behaviour Tool** is a set of three tools that companies can use - particularly for food packaging - to look at sustainable packaging from a consumer perspective.

Reuse

To reduce the environmental impact of packaging, **reuse** can be an effective strategy. Unlike single-use packaging, the energy it takes to produce the packaging is distributed over the number of use cycles, which can greatly reduce the environmental impact of producing the packaging per use cycle.

This reduction does need to account for additional steps relative to single-use packaging, such as cleaning and transportation. A saving in environmental impact (and costs) when switching to glass packaging reuse depends on this, as do the return rate, the life of the packaging and transportation distances. Scale can also have a significant effect, particularly on costs, as it allows investments in (cleaning) equipment and more efficient processes to be recovered more quickly. To determine whether switching to reusable packaging could be an attractive option, the KIDV has developed a **Calculation Tool**.

Sustainable Packaging Compass

The KIDV has developed the **Sustainable Packaging Compass** as a tool to provide insight into the recyclability, circularity and environmental impact of packaging. This does not only indicate whether the packaging is recyclable, but also to what extent the packaging is circular. The tool also gives an indication as to the packaging's environmental impact.

Companies can harness these insights to compare different units of packaging and types of packaging, assessing their scores on various aspects of sustainability. They can then use this information to set sustainable packaging objectives and quantify the effects of packaging optimisation. There is also the opportunity to get an indication of possible fee modulation for rigid and flexible plastics.

State of Sustainable Packaging

This KIDV publication offers a strategic perspective on the collaboration and innovations needed when it comes to sustainable packaging, identifying social and economic obstacles that stand in the way of sustainable packaging.

More information

If you have more questions about the Recycle Check or about making packaging more sustainable, contact the KIDV through our **Q&A**. For more information about making packaging sustainable, go to our **website** or sign up for the KIDV newsletter **here**.

Netherlands Institute
for Sustainable Packaging
part of **verpact**

Part II: Recycle Check Flexible Plastic Packaging 2026

1. Introduction

Part II of this document provides background information to support the Recycle Check for flexible plastic packaging. It provides additional information on collection, sorting and recycling. All matters that are the same for all materials are covered in Part I: The basic information is the same in each background document. It includes things such as the definition of recyclability, how to choose and use the Recycle Check correctly and how to make packaging more sustainable.

The Recycle Check for flexible plastic packaging is harmonised with Recycle Checks and guidelines developed by other countries and international organisations such as Plastic Recyclers Europe (RecyClass) and Ceflex.

2. Collection and sorting

Part I lists all the definitions that are important for conducting a Recycle Check. The following are some definitions that are specific to flexible plastic packaging.

For definitions of all the terms used in this document, see the Packaging glossary on the KIDV website.

2.1 Definition of flexible plastic packaging

This Recycle Check is intended for flexible plastic packaging only. See Part I, Section 3 for more information about what constitutes packaging.

Contrary to a rigid plastic packaging, a flexible plastic packaging can be crumpled up easily and without using much force. The material of the main component generally has a thickness of less than 100 µm. This type of packaging is more two-dimensional than three-dimensional.

Table 4. Flexible packaging

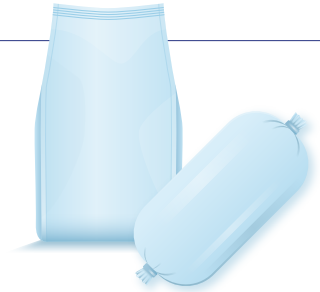
Flexible packaging		
	Structure	**Specific characteristics**
	**Shaped packaging:** • Bags • Sausages • Flow wraps • Pouches • Pillow packs	**Interior and exterior** A shaped packaging has an interior and an exterior. The interior is often made of a different material than the exterior. Because only the exterior is scanned, this decides how the material is identified.
	**Sheets, wraps and loose films:** • Top films •Wrapping paper • Wrap film • Transfer sheets	**Front and back** In a sorting facility, material is scanned from above, which means that the position of material on the sorting conveyor determines how it is identified. If the front and back of a main component are made of different types of material, it may be sorted incorrectly and disrupt the recycling process.

Table 5. **Unconfirmed flexible plastic**

**Some flexible packaging *sometimes* behave as rigid.
This can cause problems in the recycling process.**

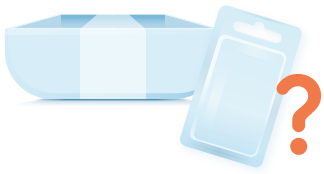
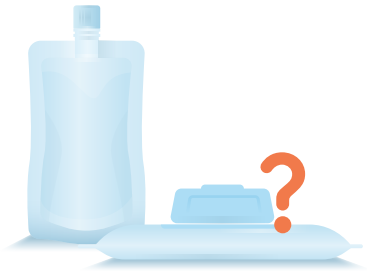
	Structure	Specific characteristics
	**3D packaging:** • Trays • Blisters *When dealing with this type of packaging, you need a sorting test to determine whether it is flexible or rigid. See Section 7 for possible testing centres.*	Through vacuum forming, a relatively thin film can be given a 3D shape with greater rigidity. Extremely thin blisters and trays can behave as flexible packaging during the sorting process, while thicker designs behave like rigid packaging instead. It is impossible to determine the line between the two types theoretically; their behaviour must be assessed in practice.
	**Flexible packaging with rigid components:** • Spouts • Valves • Zippers • Hangers *These types of packaging can be assessed using the Recycle Check for flexible plastic packaging.*	If the material enclosing the product is made of flexible plastic, it is referred to as flexible packaging with rigid components. The flexible material forms the main component. These types of packaging often behave differently during the sorting process than similar flexible packaging without these components. Only if the rigid component is very light in weight compared to the main component, is made of the same material and has a density of less than 1 g/cm^3 (such as a zipper), can it be recycled properly. Heavier rigid components can disrupt the sorting process, causing the disposable unit to end up in the wrong material stream.

Table 6. **Exceptions flexible plastic**

**Some flexible plastic packaging does not behave like flexible plastic packaging,
but like rigid plastic packaging. In this case, the packaging must be assessed according to the Recycle Check for rigid plastic packaging.**

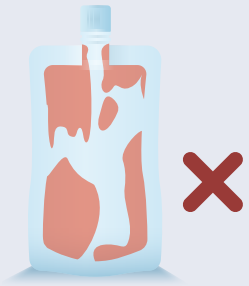
	Structure	Specific characteristics
	**Packaging that largely consists of flexible materials, yet behaves like rigid packaging:** • Tubes	A plastic tube often consists of a relatively stiff film, a spout and a cap. Tubes are naturally more rigid because of their shape. They tend to regain their original shape and behave like a rigid packaging during the sorting process. For the following types of packaging, use the Recycle Check for Rigid Plastic Packaging.

Product residue

Too much product residue makes a packaging heavy. This changes the packaging's centre of gravity and can make it behave differently during sorting and end up in the wrong sorting stream as a result. Furthermore, the recycler will have to remove the product residue from the packaging, causing an interruption in the recycling process.

This factor is not yet taken into consideration in the Recycle Check. The KIDV is developing a robust assessment method, in collaboration with other parties, such as RecyClass. If the product residue weighs more than half of the total weight of the disposable unit, the risk of disruptions is substantial.

Figure 6. Product residue



2.3 Dimensions and shape of a disposable unit

Sorting facilities sort disposable units by size. in a large rotating drum with holes of different sizes, which sifts the packaging waste. This separates components that are either too small or too large for the sorting process from all other material. Disposable units that are too large and too small are usually not submitted for recycling, even if they could technically be recycled.

Smaller than 3 cm

Small disposable units, which can pass through a 3 cm round hole in the drum screen, are usually not recycled. This concerns the disposable unit used in its flat (or filled) form. Overly small disposable units are removed from the sorting stream, because they are often heavily contaminated. Furthermore, the fraction is made up of many different types of material, which are difficult to separate using conventional techniques. In most cases, these smallest materials are incinerated with energy recovery.

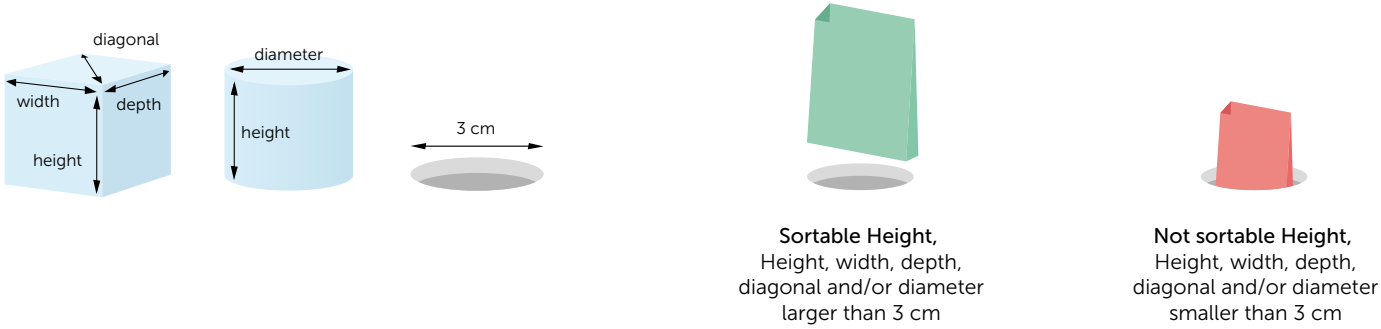
Disposable units ≥ 3 centimetres are included in the fraction to be recycled.

A4 size

Previous editions of this Recycle Check specified a minimum required size (A4 size) for flexible packaging in order to be deemed highly recyclable. This requirement was included because large flexible plastics often concerned PE films that were fairly easy to sort using an extractor system.

Nowadays, most sorters are also able to sort packaging with smaller dimensions using ballistic separators and modern NIR (near-infrared) technology. The size of packaging is therefore less relevant; flexible disposable units smaller than A4 size (but larger than 3x3 cm) are also highly recyclable, provided that they meet the rest of the requirements.

Figure 7. Packaging size



Sortable Height,
Height, width, depth, diagonal and/or diameter larger than 3 cm

Not sortable Height,
Height, width, depth, diagonal and/or diameter smaller than 3 cm

3. Recyclability focus points

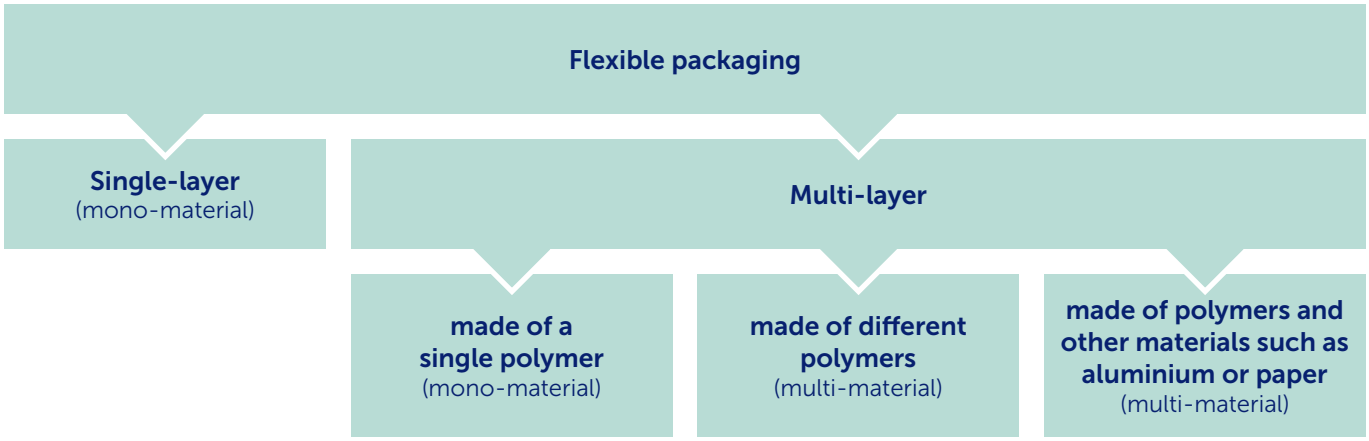
This section describes the extent to which the main component of packaging is recyclable. A distinction is made here between PE and other plastics. This section also explains the difference between mono-materials and multi-materials. For the recyclability of subcomponents, see Section 5.

3.1 Material composition of the main component

The material composition of the main component affects the recyclability of the disposable unit in question. Different types of materials, coatings, fillers and additives all affect how well recyclers can process the material.

To assess the recyclability, a distinction must be made between single-layer and multi-layer films (two or more material layers).

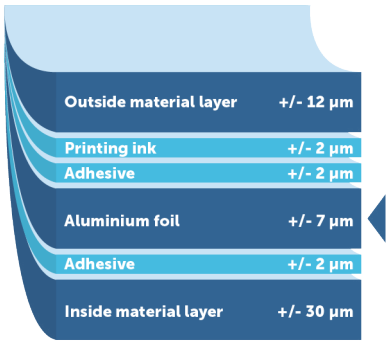
Figure 8. Overview diagram for single-layer and multi-layer flexible packaging



If a main component contains layers of different materials or additions such as coatings, barriers or additives, their impact on recyclability must be assessed. To do so, it is important to make a distinction between material layers and material additions. A layer generally has a thickness of more than 1 micrometre (1µm=10^{-6}m). The thickness of a coating is usually several nanometres (nm=10^{-9}m). This is important in order to determine whether a material is a mono-material. This is explained in more detail in the next section.

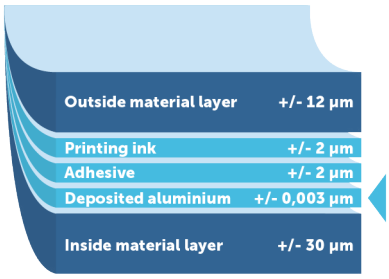
Table 7. **Difference between material layer and material addition**

Material layer



A packaging film can consist of one or more material layers. A material layer consists of one main material or polymer type that in itself forms a foil layer. In the example on the left, the aluminium foil is a material layer with a thickness of 7 µm.

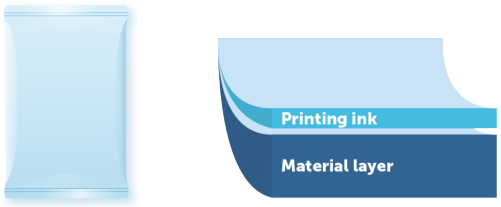
Material addition



An addition is a component that does not form a layer of the film by itself, but which is added to a material layer instead. These can be additives included in the layer, as well as additions to the surface of a material layer. This includes, for example, vapour-deposited materials or a coating.
In the left example, the vapour-deposited aluminium is a material addition measuring 0.003 µm in thickness, which equates to 3 nanometres.

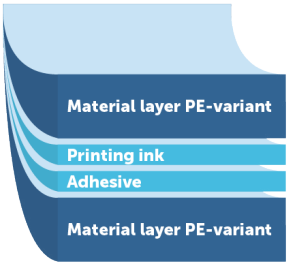
Table 8. **Schematic representation of the material composition of flexible packaging**

Single-layer film

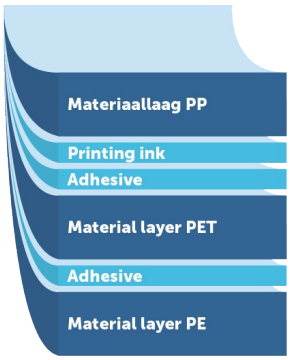


A single-layer film consists of a layer made of a single type of polymer (mono-material). Material additions such as prints may be added to the layer.

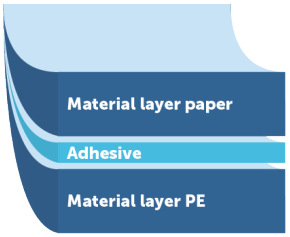
Multi-layer film



A multilayer film can consist of multiple layers made of a single type of polymer (mono-material). An example of this is a multilayer film made of different variants of PE, such as CPE, BOPE, HDPE and LDPE.

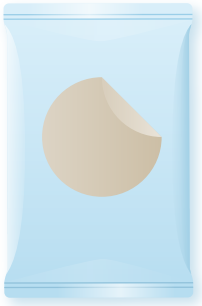


A multilayer film can also consist of multiple layers made of different types of polymer (multi-material). An example of this is a multilayer film made of a combination of PP, PET and PE.



There are also multi-layer materials that consist of layers made of non-polymer materials. Examples include multi-layer films that consist of combinations of LDPE and paper and/or combinations of OPP with a 7 µm layer of aluminium foil.

Subcomponent



When evaluating a disposable unit for this Recycle Check, a distinction is made between a material layer and the label. A label is added to the packaging using an adhesive at a later stage of the packaging process.

A label never covers the entire surface of the disposable unit and is not an integral part of the main component. The label and the adhesive used to attach it to the packaging are classified as subcomponents.

3.2 PE and PP mono-materials without additions

A main component made of PE or PP as a pure mono-material, i.e. without any additions such as coatings, barriers or additives, will generally not disrupt the recycling process.

In plastic sorting installations, disposable units are sorted by shape (flexible or rigid), by type of material (plastic, metal, beverage carton) and then by type of plastic.

Through identification of the main component, flexible plastic disposable units are sorted by type of plastic. Only flexible plastic packaging made of PE or PP is collected separately. This also includes bio-PE and bio-PP, as they have the same molecular structure as PE and PP, respectively. This Recycle Check therefore does not distinguish between bio-based and fossil PE and PP.

The share of other flexible plastic packaging of the total volume of the household waste stream is relatively small. Examples include PET, PA and PLA. Sorting and recycling these materials cost-effectively is difficult, which is why this is not done on a large scale. These materials cannot therefore be optimally recycled.

PE is the only flexible material that is recycled on a large scale into new film; the material is primarily used to make garbage bags. For the quality of the PE recycler's sorting process, it is important that foreign materials can be identified as non-PE. These materials can then be sorted into the mixed fraction or the residual fraction.

The **Community of Practice Flexible Plastics** is working to determine whether PP can become a separate sorting stream of flexible plastic mono-material. A sorting stream and a separate Recycle Check for flexible PP have been introduced. However, since flexible PP packaging is still insufficiently sorted and recycled separately, flexible PP packaging can at best be classified as moderately recyclable.

3.3 Materials that impact the recycling process

Additions to flexible plastic disposable units can reduce the quality of the recyclate, even when present in relatively small quantities. Examples include barrier layers (such as EVOH or vapour-deposited aluminium), inks, coatings and/or fillers. There are many possible combinations of these applications. Only disposable units that consist for at least 90% of PE are a good source for recycling.

Various organisations, such as RecyClass, CEFLEX and the National Test Centre Circular Plastics (NTCP), assess the impact of different material additions on the quality of the recyclate. Examples include the addition of a limited quantity of EVOH or the impact of vapour-deposited aluminium on the recycling of PE and PP. Additions of PA have also been extensively studied.

The aforementioned organisations are conducting studies to determine what material additions are permissible and in what quantities, without negatively affecting the recycling of plastic packaging. When more knowledge on this subject becomes available, KIDV will update this Recycle Check accordingly.

Below is more information about the impact different materials have on the recycling process.

Barriers, fillers and additives

Barriers, fillers and additives are substances that have been added to the plastic to give the material certain properties. Examples of barriers are EVOH, SiOX, AlOX and vapour-deposited aluminium (metallised).

Examples of fillers are minerals (e.g. lime or tallow for barrier properties), fibres (e.g. paper, glass or grass for added strength), mica (for a decorative pearlescent effect), metal flakes (for a decorative metallic effect) and iron oxide (for a decorative terracotta colour).

These additions are not always plastics and have different properties, e.g. with regard to their melting behaviour. These differences complicate the recycling process, e.g. because melt filters may get clogged. They may also affect the properties of the recycled material, making it less suitable as a raw material for the production of new packaging or products. These additions affect the quality of the recyclate to a greater or lesser extent.

Polyamide (PA) is often added to PE for greater strength and as an oxygen barrier. Currently, PE copolymers containing up to 10% PA6/66 have little disruptive potential in recycling when co-extruded with 0.5 g/g PE-MAH. Other examples of oxygen barriers are EVOH, SiOx and AlOx. Of these, SiOx and AlOx have no negative effect on recycling. EVOH in flexible PE disposable units up to 5% of the total film weight - provided it is compatible with Maleic Anhydride (MAH) during co-extrusion in a MAH/EVOH ratio of 1/1 or higher - also hardly disrupts recycling.

Coatings

A coating is usually a thin layer with a thickness of a few nanometres (nm=10^{-9} m) that is made of a different material than the main component. The coating is so thin and usually applied in such a manner that separating both material types is impossible. In films, coatings are primarily used to add a barrier or to protect the printing on the film. Coatings can impede the recycling process by discolouring or crystallising in the recycled plastic.

How barriers, fillers and additives affect density

All materials have a specific density. Plastics such as PP and PE, for example, will float in water (density <1g/ cm^3). Plastics such as PET, PS and PLA sink in water (density > 1g/cm^3). Recyclers make effective use of this property during the separation process with the help of a so-called sink-float tank. These tanks make it easy to separate e.g. PE and PET. A disposable unit's behaviour in a sink-float tank
can easily be determined by submerging it in water and seeing if it floats.

By e.g. adding gas bubbles to PET (foaming), the material's density is altered, causing it to float. As a result, the sink-float method loses its effectiveness and the PET will end up in the wrong material stream. In this example, the foamed PET will contaminate the PE stream.

Similarly, the density of PE and PP can be increased by adding a lot of tallow or lime, causing these materials to sink and contaminate the PET stream.

Adhesive between main component lamination layers

Adhesives between lamination layers can disrupt the recycling process. The impact of the disruption differs per type of adhesive. The *RecyClass* **Design for Recycling Guidelines** permit certain adhesives in specific quantities, as they will hardly disrupt the recycling process. KIDV is in the process of quantifying this in a next version of the Recycle Check. See Section 6 for more information about adhesives.

Disruptors

PVC and PVdC

PVC (polyvinyl chloride) and PVdC (polyvinylidene chloride) used in packaging material disrupt the recycling of other plastics. When PVC enters the recycling stream of other plastics, e.g. as a label, it triggers an unwanted chemical reaction Recycling equipment can get damaged due to the formation of hydrochloric acid. The same applies to PVdC, which is mainly used as a barrier in films.

PVC in applications other than packaging, also known as vinyl, is highly recyclable when processed as a separate stream. PVC recyclate is widely used and features in PVC sewage pipes, for instance.

Oxo-degradable plastics

Oxo-degradable or oxo-biodegradable plastics are plastics containing additives that disintegrate into small pieces (microplastics) when exposed to ultraviolet light and oxygen. These additives can be added to all plastics. Oxo-degradable plastics are mainly used in carrier bags and bags, but they can also be found in flexible plastic applications. If oxo-degradable materials end up in recycling streams, they affect the quality of the plastic recyclate, which makes them disruptors.

Oxo-degradable packaging was banned in the Netherlands with the introduction of the **Packaging Management Decree 2014**. The European Union banned the use of oxo-degradable material in packaging with effect from 3 July 2021.

Non-plastic material layers in flexible plastic packaging

In general, non-plastic materials such as paper and aluminium should never end up in the recycling stream for flexible plastic packaging. These materials are undesired because they will not melt during the recycling process. The materials may accumulate in the sorting filters, while paper fibres may be incinerated. Removing these materials entirely during the sorting process is often difficult. Paper fibres in particular will stick to the plastic and end up in the recycling stream after all.

3.4 Colour

Plastic packaging with no added colourants offers more possibilities in terms of post-recycling applications than coloured packaging. Colourless transparent packaging can be used to produce new transparent packaging. After recycling, white packaging can be used to produce new packaging in a variety of bright colours. Colourless materials are therefore often recyclable for several cycles and can be used for new packaging.

Main components can be coloured in various ways, such as mixing a colourant into the base material (master batch). These colours can affect sortability and recyclability.

Coloured PET, PE or PP

Mixing plastics with uncoloured plastics causes discolouration. Discoloured material cannot be restored to its colourless or transparent state using conventional mechanical recycling techniques, thus limiting the possible applications of this material.

Opaque PET

Opaque PET is non-translucent and is often coloured white using e.g. titanium oxide, calcium oxide, calcium carbonate or tin oxide as a colourant. In large quantities, these colourants may interfere with the recycling process.

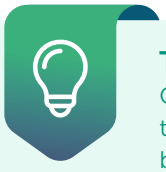
Flexible packaging

The most commonly used sorting technique uses near-infrared (NIR) scanners, which analyse the spectrum of the reflected infrared light to identify different plastics. Black packaging absorbs the infrared light instead of reflecting it. This prevents the NIR scanner from 'reading' the reflection. As the type of plastic cannot be identified, the disposable unit is not sorted (properly). This is especially true if the material of the main component is fully coloured. Likewise, there is a significant risk of sorting errors if the main component is printed black, if a black intermediate layer is applied or if a large of its surface is covered with a black label or sleeve. (Small) black lids or caps do not affect detection, because the NIR scanner scans the main component of the packaging.

Some sorting systems are capable of detecting plastic with lots of black colouring, but cannot yet sort plastic by material type. As the type of plastic cannot be identified, the packaging will end in the mixed stream. Although there are black colourants that affect the sortability of packaging to a lesser extent, the risk of sorting errors is still present. On top of that, black colourants have a major impact on the colour of the recyclate, limiting its future applications.

Shiny packaging

NIR cameras may not be able to properly identify the material used in disposable units with a shiny surface (e.g. metallised packaging). If the shiny surface is covered with a layer of ink or plastic, the material can usually be identified correctly.



TIP

One advantage of black packaging is that it is easy to use in combination with recycled content, provided the original colour of the recycled material is less relevant. However, black packaging is less likely to be sorted and recycled properly after the next cycle. Non-black packaging is more likely to be sorted properly and therefore more likely to be recycled. If it is absolutely necessary to colour packaging black, make sure to use as much recycled material as possible.

3.5 Future developments

There are ongoing developments involving the use of new technologies to sort black plastic. Although these make it possible to detect black disposable units, they still cannot be sorted by material type. As the type of plastic cannot be identified, the packaging will end in the mixed stream.

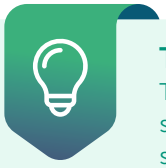
Specific packaging can be sorted using markings/codes on the packaging or with the help of AI. This would make it possible to, for example, sort non-food packaging into a separate stream. Such techniques can be used to simplify the recycling process.

4. Labels, sleeves and prints

Disposable units without labels, sleeves or direct prints are usually more recyclable.

For optimal recycling, it is best to use a label made of the same material as a disposable unit's main component.

The size of the label also affects sortability. If a label covers all or most of the disposable unit, it will be more difficult to determine the material type of the main component. When determining the extent to which a label or sleeve covers the main component, the side of the packaging where the largest portion of the label is visible must be assessed. Depending on the label's material type, a sorter may not be able to sort the disposable unit into the correct material stream, which means it will end up with the wrong recycler.



TIP
The National Circular Plastics Test Centre has developed a handy tool to determine the size of labels and sleeves relative to the main component. To assess the coverage ratio, always look at the most covered side of the disposable unit. **Click here to go to the tool**.

Different materials have different impacts on recycling. Certain material combinations of the main component and the label are easier or harder to separate.

Not all materials affect the quality of the recycling to the same degree.

4.1 Label size

Labels made of different materials than the main component are hard to separate from the main component, even if these labels are washable at low temperature. On a PE film, it is therefore best to use labels made of PE, not PP or PET.

Sortability of oversized labels

Oversized labels and sleeves do not have a negative impact on the sorting process when made of the same material as the main component. The subcomponent is sorted with the main component towards the correct stream, and both end up at the right recycler.

If complete removal of the label is the only way the consumer can use the product, the label is deemed a separate disposable unit. In that case, the material does not affect the sortability of the main component. If it is unlikely that the consumer will remove the label, the label forms a subcomponent which, if too large, will impede the sorting process.

4.2 Printing

Inks and sometimes coatings are used for label printing and direct printing. As long as this is not completely black and the prints or coatings do not cover more than 30% of the surface of the disposable unit, the application thereof currently has no influence on the Recycle Check score.

TIP • Ink use

- Minimise the use of inks, especially those based on nitrocellulose.
- Make sure that the inks and the labels can be separated from the material ofthe main component. Inks that dissolve in the washing water can precipitate on the target material during drying and cause discolouration.
- Use inks that comply with EuPIA guidelines.*
- It is best to use laser coding when applying information directly to the main component.

* EuPIA-compliant inks release fewer harmful substances into the residual stream after deinking. The EuPIA guidelines provide no indication of how well inks can be separated from the materials.

For more information, consult the KIDV fact sheet on inks - printing on packaging

4.3 Non-plastic materials in labels

In general, non-plastic materials such as paper and aluminium must not be allowed to end up in the recycling stream for flexible plastic packaging. These materials are undesired because they will not melt during the recycling process. The materials may accumulate in the sorting filters, while paper fibres may be incinerated. Removing these materials entirely during the sorting process is often difficult.

Paper labels

With paper labels, fibres may come off when the material is shredded or washed. These fibres are hard or impossible to separate from the material of the main component. The fibres may clog the filters in the recycling facility or incinerate during the extrusion process. This disrupts the recycling process, as it creates impurities in the recycled plastic.

Thermal paper may contain the disruptor bisphenol A, which also causes problems during recycling.

Metallised labels

Like metallised flexible disposable units, metallised labels contain vapour-deposited aluminium. These labels may impede both sorting (their reflectiveness disrupts material identification) and recycling (by causing discolouration of the recyclate). In certain cases, the same is true for the inks used for direct prints. If these inks end up in the recycling process, they can significantly affect the quality of the recyclate.

In the Recycle Check, the extent to which labels or direct printing affect both sorting and recycling is determined one step at a time.

Foamed labels

Foaming a plastic, i.e. injecting gas bubbles into the material to alter its texture, will change the material's density and may therefore interfere with flotation separation. This makes foamed PET labels more difficult to separate from the PE or PP of the main component.

4.4 Future developments

It is becoming common practice to factor in subcomponents such as labels and closures when assessing the recyclability of packaging. The focus is shifting from removing undesirable materials to isolate the main component to producing subcomponents from materials that can be recycled as a secondary stream in and of themselves. Adhesives and inks also play an increasingly large role in this As time goes on, more information is becoming available about how adhesives and inks affect recycling. More information on the impact of adhesives can be found in Section 6.

5. Closures and other subcomponents

The rule of thumb in recycling is always: what has not been added need not be removed. If a disposable unit has no subcomponents, they cannot interfere. The impact various subcomponents can have, is explained below.

For more information about distinguishing between main and subcomponents, see Part I, Section 3 of this document.

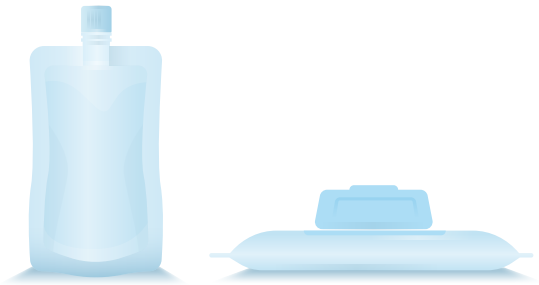
5.1 General effects

Disposable units with rigid components

Rigid components that form part of packaging, such as caps, spouts, valves, lids, zippers, handles or hooks, sometimes consist of a material different than the main component. This different material impedes the recycling of the flexible plastic materials. Furthermore, these disposable units may behave like rigid disposable units during the sorting process, which means they often end up in the wrong sorting stream and can therefore not be recycled properly.

If the rigid component is made of the same material as the main component, it does not pose a problem for the recycling process, but it may cause problems during sorting.

Figure 9. Disposable units with rigid components



There are many types of packaging that contain rigid components. The ratio between the flexible component and the rigid component can vary significantly. Take the small valve on a one-kilogram bag of coffee beans, for example, or the plastic lid on a flow wrap with wet wipes. It is difficult to define a clear limit for ratios that can be properly sorted and those that cannot.

Only if the rigid component is very light in weight compared to the main component and made of the same material (such as a zipper), is it deemed highly recyclable. All other cases are classified as risks.

Enclosed metal subcomponents

Enclosed metal components, such as sausage wrap closures, bread bag clips and radio frequency identification (RFID) chips impede the recycling process not separated from the plastic.

If the metals are enclosed and/or attached to the packaging and cannot be separated using magnets (for ferrous metals) or the eddy current method (for non-ferrous metals), they often end up in plastic recycling.

They move along in the sorting stream with flexible materials, which are then shredded into smaller flakes. The metal parts can damage the blades and the small metal particles cause contamination during the extrusion process. Consequently, packaging with enclosed metal components cannot be easily recycled.

Non-plastic materials

There are many examples of non-plastic materials that are used in laminates and other components which are attached to the disposable unit, including

- aluminium processed into laminate packaging, such as soup bags
- shrink film with cardboard inserts
- plastic bags with aluminium press studs

Paper is also an undesired material in the recycling of plastic disposable units. As paper fibres will not melt, they may accumulate in the sorting filters and incinerate. The incinerated particles can negatively affect the quality of the recyclate. Removing these materials entirely during the sorting process is often difficult. with paper fibres in particular sticking to the plastic. Similarly, parts of aluminium seals may adhere to the adhesive edge of the main component and end up in the recycling stream after all.

Wooden, aluminium and paper or cardboard components are in any case undesirable, regardless of whether they come loose from the disposable unit, because they can contaminate the secondary stream, making it impossible to process this stream into new raw materials.

Closures containing disruptors such as PVC and PVdC

PVC (polyvinyl chloride) and PVdC (polyvinylidene chloride) used in packaging material disrupt the recycling of other plastics. When PVC enters the recycling stream of other plastics, e.g. as a label, it triggers an unwanted chemical reaction Recycling equipment can get damaged due to the formation of hydrochloric acid. The same applies to PVdC, which is mainly used as a barrier in films.

PVC in applications other than packaging, also known as vinyl, is highly recyclable when processed as a separate stream. PVC recyclate is widely used and features in PVC sewage pipes, for instance.

Closures containing disruptors such as silicones and/or elastomers

Elastomers such as silicones, acrylates and other rubber-like plastics are used for applications that require elasticity, resilience and tensile strength. They occur in packaging as closures, valves and dosing systems. For example: a membrane can be fitted in a dosing mechanism or valve to ensure proper dosing of the product. If these parts are made of the wrong material, they will disrupt the recycling process. Generally speaking, silicones and elastomers cause various types of damage, such as imperfections and defects in the surface of products made from recycled plastic.

Other rigid subcomponents

PE and/or PP-based material with a density <1 g/cm^3

Sink-float baths are used to separate PE and PP (which have a lower density than water) from heavier plastics such as PET and PS.

PE and PP can be processed together reasonably well during the recycling process. PE closures and components attached to PP disposable units are allowed in the PP recycling stream to a limited degree. However, stricter requirements apply to the presence of PP closures and components of PE disposable units. Sorting processes are therefore designed to prevent too much PP from ending up in the PE stream.

Other plastics such as PET, PS, PC or PE and/or PP with a density >1 g/cm^3

If closures or other subcomponents with a higher density increase the weight of the flakes of the disposable unit to approx. 1 g/cm^3 or higher, the flakes will at best end up in the mixed plastic stream.

5.2 Future developments

It is becoming common practice to factor in the materials used for subcomponents when assessing the recyclability of packaging. The focus is shifting from removing undesirable materials in order to isolate the main component to producing subcomponents from materials that can be recycled as a secondary stream in and of themselves also. Adhesives also play an increasingly large role in this, as we are finding out more and more about how adhesives and inks affect recycling. More information on the impact of adhesives can be found in Section 6.

6. Adhesives

The rule of thumb in recycling is always: what has not been added need not be removed. Most recyclers of flexible PE packaging use cold-washing processes. In order to recycle sorted disposable units, they must first be shredded into flakes. The flakes are washed at a low temperature (20-25°C) to remove as many contaminants, labels and adhesives as possible.

6.1 Adhesive use on labels and subcomponents

The use of adhesive can interfere in the recycling process. We do not know enough yet about the impact of these adhesives, as various organisations are still studying their effects. The influence of adhesives is not yet included in the Checklist score.

6.2 Adhesives between laminated layers

Co-extrusion is preferred when connecting layers. In co-extrusion, multiple materials are pressed or blown through a mould and melted together, often with the help of a thin adhesive layer (tie-layer).

If the layers are glued together, the adhesive can disrupt the recycling process. More and more information about the effect of these adhesives is becoming available from various organisations.

RecyClass has put a number of **test protocols** online. These protocols (carried out by RecyClass certified test laboratories) can be used to determine, among other things, how well the material can be recycled. RecyClass also publishes approved **material combinations**. Overviews of recyclability of adhesives can be found here for **PE** and **PP**.

If multiple positive test results occur for certain material combinations, the Recycle Check can be adjusted accordingly in the future.

6.3 Future developments

The so-called delamination primer is a new development in this field. It consists of a printed layer between different layers of plastic that ensures that the layers separate easily during recycling and each layer can be recycled separately. This has been tested on a pilot scale only.

7. Additional sources of information

- KIDV Protocol overview
- KIDV Tools for Recycle Checks and Fee Modulation
- KIDV packaging glossary
- KIDV packaging policy and legislation
- Verpact Fee Modulation plastic 2.0
- Disposal Guide

Checks and guidelines:

- RecyClass
  is a collaboration between recyclers and offers various tools to improve the recyclability of plastic packaging in the European market. In addition to an online tool, they publish test results and offer design for recycling guidelines.
- Ceflex
  Collaborative initiative representing the entire flexible packaging value chain.
- Circpack
  Veolia research institute for testing and optimising packaging solutions. The Veolia sorting facilities can be used for this purpose.
- Citeo
  French producer responsibility organisation.
- Cotrep
  French institute that develops design for recycling guidelines for plastic packaging.
- Cyclos-HTP
  German institute that can test and certify packaging materials, among other things.
- NTCP
  The National Test Centre for Circular Plastics operates a pilot sorting line plus washing facilities that can simulate sorting and washing processes. At the centre you can investigate how these processes and packaging concepts can be optimised.



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