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

FACTSHEET

Beverage Cartons

JULY 2024

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

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KIDV has taken the utmost care in preparing this document. Please notify us if the document contains inaccuracies or omissions (info@kidv.nl).

1. Introduction

What sustainability aspects are involved when it comes to beverage cartons? How are beverage cartons recycled? KIDV receives these and other questions about beverage cartons on a regular basis. To answer those questions, KIDV has prepared this fact sheet.

This June 2024 update was drafted to better reflect the new definition of beverage cartons, described in the *Decree on Packaging Management* (2014)[1] as 'packaging suitable for packaging liquid foods, other than drinking cups, with paper or cardboard as the main component'. This means that the definition covers more types of packaging than before: not only standard beverage cartons, such as the so-called bricks and gabletops2 that we all know, usually used for milk and juice, but also all other types of packaging that consist of over 50% fibre and are able to contain liquid. Out of all beverage cartons entering the market, standard beverage cartons remain the largest group, even with the new definition. This is further explained in chapter 2.
In addition to the change in definition, several factors influencing the *design for recycling* have been added; see section 3.5.

1.1 What are the contents of this fact sheet?

In this fact sheet, KIDV provides a factual outline of various aspects of beverage cartons, such as range of use and composition, recyclability, circularity and environmental impact in the current Dutch context. Identified opportunities and bottlenecks are also discussed. For more details and in-depth information, please be referred to the referenced reports.

This fact sheet focuses only on beverage cartons and the aspects mentioned above. In a corporate context and in society as a whole, the discussion and considerations involved are much broader. For example, considerations may involve which types of products are best packaged in which types of packaging, what the environmental footprint is of packaging plus product, and which aspects are more important: climate, biodiversity, circularity, etc. KIDV realises the breadth of this issue but has chosen to limit this particular fact sheet to the beverage carton packaging type only.

If the development of new sorting and recycling technologies, new materials or new policies affect the correctness of this fact sheet, it will be updated as soon as possible.

1.2 Main conclusions

- In the Netherlands, beverage cartons are mainly used to pack liquids (dairy products, juices, soups, sauces and water). A unique aspect of the Netherlands is that dairy products with a higher viscosity are typically packaged in beverage cartons as well. About a quarter of

[1] More information: Decree on Packaging Management.

[2] Examples of such packaging can be found on Hedra's website (Dutch): https://hedra.nl/wat-zijn-drankenkartons/

beverage cartons contain such products. Due to the larger amount of residual product leftover after use, this may pose challenges for sorting. The beverage cartons that come out of post-separation are not necessarily accepted by all recyclers. Solutions are being sought for both issues.

- The Dutch market share of beverage cartons in recent years amounts to around 52 - 55 kilo tonnes per year. According to Wageningen Food & Biobased Research (WFBR), the recycling rate of beverage cartons was 31 percent in 2020. At the time of writing, these are the most recently published figures. A target for beverage carton recycling has been in effect since 1 July 2023, which Verpact will report on in the 2nd half of 2024. If these figures are known by that time, we will update this fact sheet accordingly.
- KIDV currently considers beverage cartons to be *reasonably recyclable*, based on the information currently available and set out in this fact sheet. For any determination of '*good recyclability*' according to KIDV, a Recycle Check is required. This check is currently under development.

2. Range of use and composition of beverage cartons

The first beverage carton was developed by Tetra Pak in the early 1950s. This was a pyramid-shaped packaging made of cardboard with a plastic layer. The rectangular beverage carton that we mainly see today, known as the 'brick', has been around for almost sixty years[3] now. The brick was developed by Tetra Pak at the time and proved a great success due to its efficient rectangular shape, which minimises the transport of air. Nowadays, there are several beverage carton suppliers in Europe, such as Tetra Pak, Elopak, SIG Combiblock and Italpack, as well as Greatview and Lamipack outside of Europe.

A new definition of beverage cartons was introduced in the Netherlands in 2023. This definition appears in the *Decree on Packaging Management* and reads: 'packaging suitable for packaging liquid foods, other than drinking cups, with paper or cardboard as the main component'. Previously, a fibre content of at least 70% was required, but now the main requirement is the relative proportion compared to the packaging. The fibre content (paper/cardboard) must outweigh all other materials for the item to qualify as a beverage carton.

Due to this change, more types of packaging are now covered, beyond the standard beverage carton as marketed by the above parties. For more clarification, Verpact interprets the legal definition[4] in the following way:

[3] More information: https://en.wikipedia.org/wiki/Tetra_Brik

[4] Source and more background information: https://www.verpact.nl/en/beverage-cartons

- '*Packaging*':
  Laminated packaging for which the paper and plastic components cannot be separated by hand.
- '*Suitable for liquid food packaging*':
  As per this definition, it is not important whether the packaging contains a liquid food, but only whether the packaging is suitable for containing a liquid food. In case of doubt, it should be established whether the packaging is (and remains) leak-proof when filled with water.
- '*Other than drinking cups*':
  If a type of packaging falls under 'drinking cups' as per the Single Use Plastics[5] (SUP) scheme, it is automatically not covered by the definition of beverage cartons. The framework for the SUP indicates that 'cups' containing, for example, dairy, ice cream or yoghurt, are not classified as 'drinking cups' as per the SUP scheme, but as food packaging. Conversely, cups that contain a powder that needs to be diluted with water are considered 'drinking cups'.
- '*With paper and/or cardboard as the main component*':
  As for other materials, the 'main component' is determined based on the weight of the different materials in the relevant product packaging. The component that weighs the most is considered the main component.

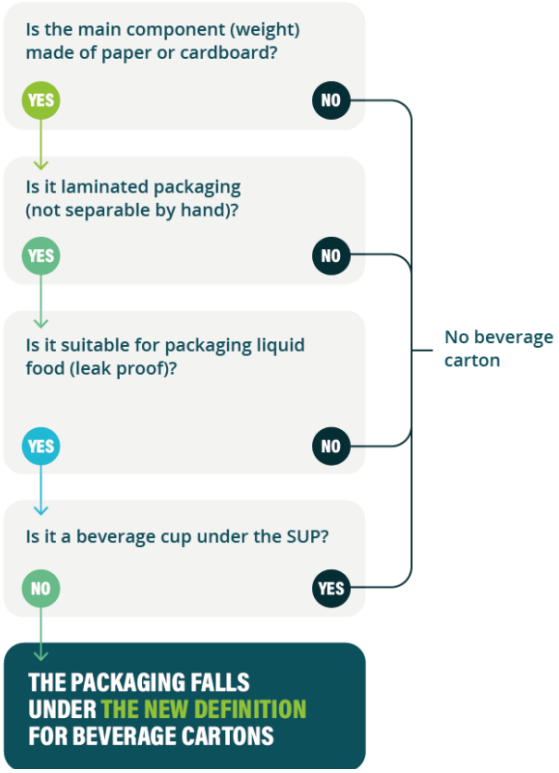

Figure 1 Decision tree for determining whether or not a packaging constitutes a beverage carton. Source www.verpact.nl

2.1 Range of use

Beverage cartons are widely used. In the Netherlands, they are used primarily to package liquids such as dairy products, juices, soups, sauces, waters, and more recently, pulses. They are also sometimes used for dry products, such as sugar. Additionally, a unique aspect of the Netherlands is that dairy products with a higher viscosity like custard or yoghurt are also typically packaged in beverage cartons. This is not or rarely the case in other countries.

The Dutch annual market share of beverage cartons amounts to around 55 kilo tonnes6. Most of them are used for chilled products, amounting to around 55 percent.7 This includes products such as

[5] More information on the SUP scheme can be found here https://minderwegwerpplastic.nl/
[6] 2020 figure, Thoden van Velzen, E. U., & Smeding, I. W. (2022). Recycling of Dutch beverage cartons. (Report / Wageningen Food & Biobased Research; No. 2275). Wageningen Food & Biobased Research https://doi.org/10.18174/567789.
[7] Source: Hedra presentation dated 24 August 2022.

fresh dairy with a short shelf-life. The remaining 45 percent8 is used for long-life products, such as juices. These so-called aseptic packaging (protective against germs) give products a longer shelf life without the need for refrigeration.

2.2 Composition

Classic beverage cartons are composed of several layers. The base layer consists of paper. LDPE (low-density polyethylene) and sometimes aluminium are laminated on top. Polyamide (PA) can be used instead of aluminium as a barrier layer between the cardboard and the LDPE layer.

A beverage carton may have a cap, but beverage cartons without a cap have also (re)appeared. Caps are usually made of PE (polyethylene) or sometimes PP (polypropylene). The cap is attached to the beverage carton by way of a spout made out of the same material as the cap (also called a 'shoulder').

So-called *tethered caps* are also in use[9]. These are hinged caps that remain attached to the packaging after the beverage carton is opened. According to the *Decree on Packaging Management*, which implements (among other things) the SUP Directive containing beverages) must be fitted with caps and lids that remain attached to the packaging during use as of 3 July 2024.

Figure 2 Hinged cap example.

Aseptic beverage cartons, for long-life products, have the following weight distribution on average:

- 78 percent paper (new, long fibre);
- 20 percent LDPE for plastic layer and/or HDPE (high density polyethylene) or PP for cap and shoulder;
- 2 per cent aluminium.

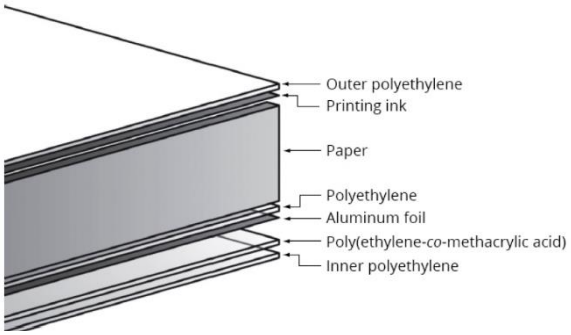

Figure 3 Schematic representation of a beverage carton with aluminium layer (Recycling of Aseptic Beverage Cartons: A Review, Gordon L Robertson)

Beverage cartons for chilled beverages do not have an aluminium layer, but they do have an LDPE layer on the inside and outside of the packaging.

[8] Source: Hedra presentation dated 24 August 2022.
[9] More information: Packaging Insights, Tetra Pak - Tethered caps, SIG - Tethered caps.

A beverage carton with cap and a volume of one litre weighs 30 grams on average, with the cap weighing about 3 grams.[10]

Composition data regarding other types of packaging covered by the new definition is not yet available.

2.3 Developments in the market

Retail is experiencing a shift towards packaging that either uses more natural fibres, or is made entirely from plastic. Such shifts take place gradually. They usually stem from companies' own objectives, such as striving to reduce the use of materials, increase circularity or lower their environmental impact. Existing or forthcoming legislation or regulations are often the driving force behind such shifts. In recent years, between 52 and 55 ktonnes of beverage cartons entered the market[11].

Beverage carton producers are working on a number of developments, such as aluminium-free beverage cartons for long-life products. Instead of aluminium, other materials will be used to create the necessary barrier. Depending on the type of product and barrier required, the materials being used include EVOH (ethylene vinyl alcohol), SiOx (silicon oxide), AlOx (aluminium oxide) and PA (polyamide) copolymer. Paper-based barriers are also under development[12].

Usually, fossil raw materials are used for the production of the plastic layer (LDPE; Low Density Polyethylene). Biomass, such as sugar cane, can be used for the production instead. This bio-based-LDPE is also used in beverage cartons. Bio-based LDPE is identical in terms of its properties to fossil LDPE and is similarly part of the laminate[13].

[10] Source: Packaging barometer KIDV, 2019.

[11] These are the most recent industry figures available and will be updated once Verpact's monitoring report is published.

[12] https://www.tetrapak.com/about-tetra-pak/news-and-events/newsarchive/tetra-pak-and-lactogal-cut-carbon-footprint-of-aseptic-cartons-for-milk

[13] More information: Green Deal Green Certificates - Best practices.

3. Recyclability

The recyclability of packaging is partly determined by whether it is collected, sorted, recycled and reused. In addition, there has been a recycling target for beverage cartons since 1 July 2023, set at 34% for 2023 and rising to 55% by 2030. These are two separate matters which are also highly related[14].

Recyclability defines how well a type of packaging or disposable unit fits into the current system of collection, sorting, recycling and how the raw material can be reused. The options range from *non-recyclable, limited* and *reasonable* recyclable to *good* recyclable. This involves evaluation of the disposable unit and analysis of the odds of it going through the entire process optimally, considering the specific design of that disposable unit. As a basis for this assessment, the KIDV uses the definition given in the box below.

The **recycling target** refers to the amount of material that will need to be collected, sorted and recycled after the product is brought to market. Starting from 1 July 2024, a higher percentage of beverage cartons put on the market in the Netherlands must be recycled every year.

Recyclability

A precondition for recycling a disposable unit is that it fits into the current Dutch system of collection, sorting, recycling and that the raw material can be reused. This involves evaluation of the disposable unit and analysis of the odds of it going through the entire process optimally, considering the specific design of that disposable unit.

Recyclable packaging must meet four criteria:

1. The disposable unit is composed in such a way that it is eligible for collection by authorised waste collectors.

2. The disposable unit is sorted and/or bundled into pre-specified streams for recycling processes.

3. Through a recycling process, the material* is processed and recovered as a raw material on an industrial scale**.

4. The recovered raw material has a uniform composition*** and is used in the production of new packaging or products.

* Depending on the material of the main component of the disposable unit, a certain minimum amount of target material is required for the recycling process for the unit to achieve *good recyclability*. This is determined using the Recycle Check.

[14] See: https://zoek.officielebekendmakingen.nl/stcrt-2023-15792.pdf

** Industrial scale means that more than half of the disposable units entering the market reach recyclers and that sufficient recycling capacity exists within Europe to recycle the sorted material.

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

Once these four basic criteria have been met, the KIDV Recycle Check can be used to assess whether the disposable unit has *good, reasonable, limited* or *no* suitability for recycling.

Producers of innovative materials must demonstrate that these materials can be collected and sorted in sufficient quantities, are compatible with existing industrial recycling processes, or that new processes are available on an industrial scale. A new scheme (innovation programme) has been created for coordinating innovative materials with tariff differentiation. Visit the Verpact website for more information.

Based on current knowledge, beverage cartons are currently *reasonably recyclable* according to the KIDV. KIDV is currently working on a Recycle Check for beverage cartons; see section 3.5 of this fact sheet.

3.1 Overview of the chain

Figures 4 and 5 provide a schematic overview of beverage carton sorting and recycling in the Netherlands. Figure 4 shows how beverage cartons are sorted in a sorting plant, which is also explained in the KIDV E-learning module Sorting and recycling processes for plastic packaging. Figure 5 shows the recycling steps that follow, as described by EXTR:ACT, the European knowledge organisation of beverage carton producers.

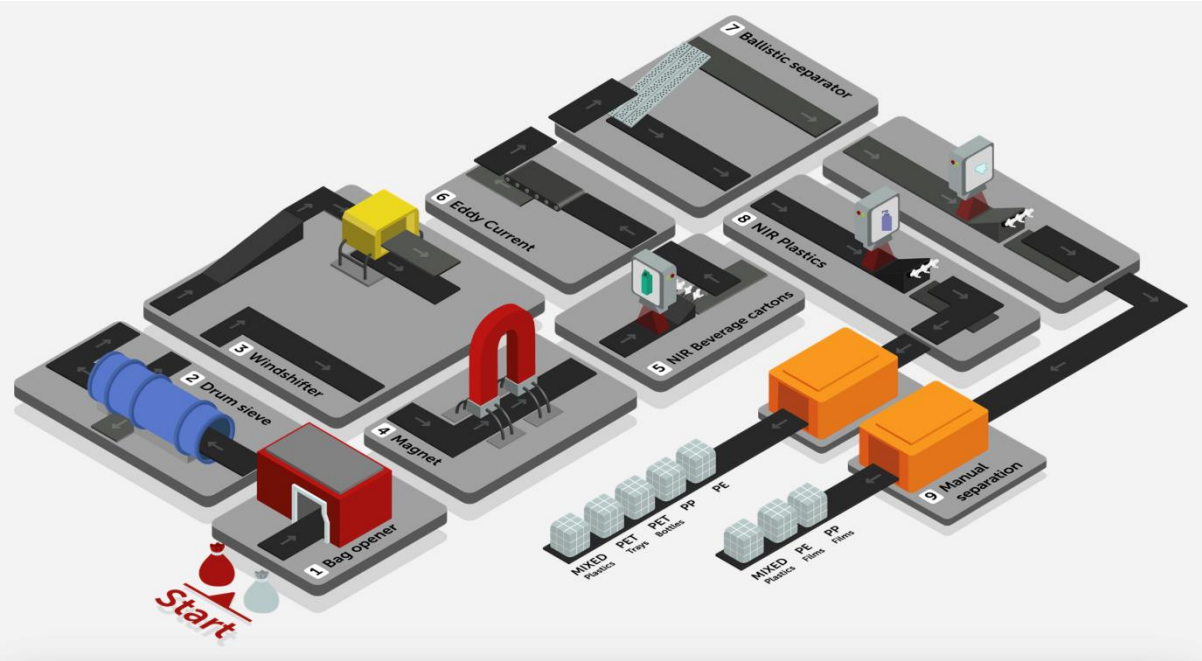

Figure 4 Sorting of beverage cartons in a PMD sorting facility. Source: screenshot of KIDV E-learning module 'Sorting and recycling processes for plastic packaging'.

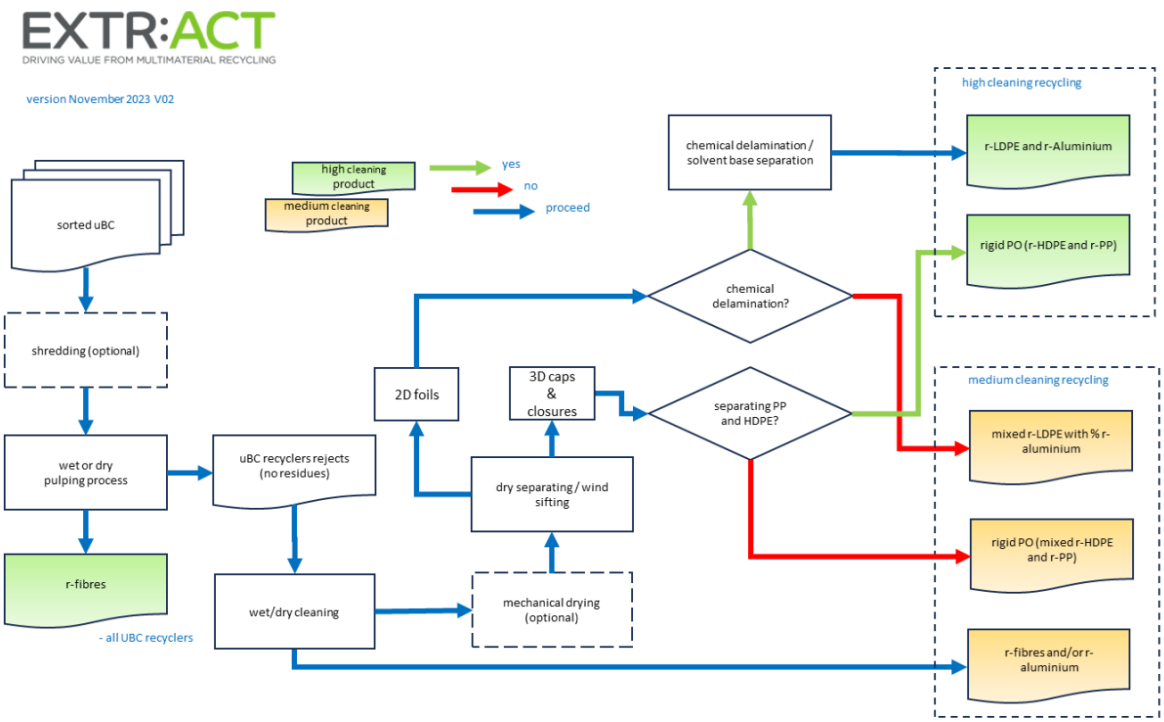

Figure 5 Recycling steps for beverage cartons. Source EXTR:ACT

Figure 6 provides a schematic overview of the different steps in the chain, as created by Wageningen Food & Biobased Research (WFBR). WFBR's research (only available in Dutch) suggests that only the cardboard in beverage cartons was being recycled in 2020. The average calculated recycling rate of beverage cartons was 31 percent. According to the study – based on data from 2020 – a recycling rate of up to 52 percent can be achieved with the current conditions in an ideal (and theoretical) case. Chapter 6 describes the bottlenecks and discusses potential steps for improvement.

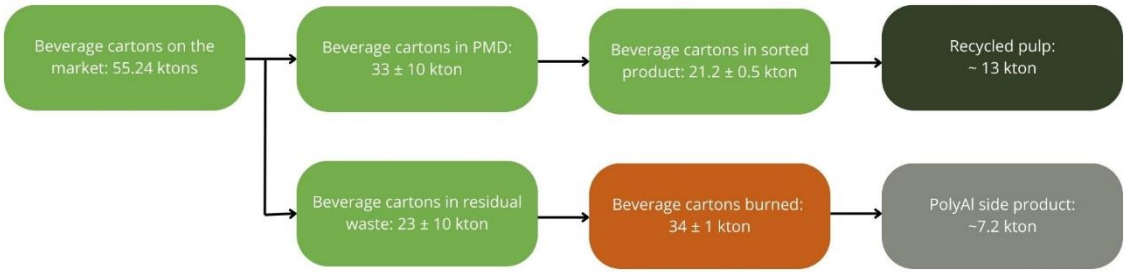

Figure 6 Schematic overview for the chain of Dutch beverage carton recycling in 2020. All weights are net weights (after removal of materials like plastics, glass, metals etc.). This means that most numbers here were calculated with the available ratios,. derivations and coefficients. Source: 'Recycling van Nederlandse drankenkartons' Wageningen Food & Biobased Research (this article is only available in Dutch)

3.2 Collection

Drinks cartons in the Netherlands are collected mainly by source separation (in many municipalities, via so-called 'PMD' waste, i.e. plastic packaging, metal and beverage cartons) or otherwise by post-separation of household residual waste. Collection is also done by way of source separation in commercial environments (Plastic and beverage cartons via the Afval Goed Geregeld platform). Separate collection of beverage cartons was introduced in 2015. Of all material collected, 79 percent[15] is currently collected via source separation and the remainder via post-separation.

3.3 Sorting

The beverage cartons are sorted and baled after collection from PMD or post-separation from household residual waste. During the sorting process, beverage cartons are separated from other packaging waste using Near Infra-Red (NIR) cameras, configured for a combination of cardboard

[15] Source: Hedra presentation dated 24 August 2022.

and an LDPE outer layer.
Sorters indicate, however, that if too much residual product is left in the packaging because it has not been emptied properly and therefore has become too heavy, the air jet, which is set up right after the NIR camera, often proves unable to eject this packaging properly. In this case, the beverage carton disappears into the sorting plant residual waste and is then incinerated for energy recovery.

3.4 Recycling

While beverage carton recycling seems similar to that of paper and cardboard, it is carried out by paper mills with dedicated equipment. The Netherlands currently has no such facilities. As such, all beverage cartons are recycled elsewhere in Europe. Whenever possible, plants that also offer PolyAl recycling are used.

As beverage cartons are laminated on two sides, an additional step in the recycling process is needed to separate the aluminium and LDPE from the fibres. This process results in three material streams:

- Paper fibres
- Rigid HDPE and PP from cap and shoulder
- A combination of LDPE and aluminium (PolyAl)

The paper fibres are loosened in a so-called pulper and can be reprocessed into new products and packaging. An example of such a use is as paper for corrugated boxes. The recycled fibres cannot be used in direct contact with food, partly because they may contain mineral oils, such as those from printing ink. If this recycled paper and cardboard were used to make food packaging, these oils could migrate to the food. To be able to use it for such applications, a functional barrier[16] needs to be applied to the cardboard.

The fibre quality of the processed packaging is also important in this regard. Standard beverage cartons are made of relatively long fibres, enabling conversion into corrugated boxes.

A substantial improvement in recyclability could be made by simplifying the materials: for example, using only paper and LDPE. Unfortunately, such a solution is not suitable for long-life products. After all, they need a good barrier. These extra layers very likely only add to the complexity of recycling and affect the recyclability of the non-fibre part of the packaging. The multiple layers

[16] A functional barrier is a so-called barrier layer that separates the packaging material from the foodstuff, preventing migration from the packaging material to the foodstuff.

create a less uniform composition and can cause discolouration and make the packaging more difficult to process.

The recycling of the non-fibre part of the packaging results in two mixed streams: the PolyAl mixed stream (LDPE film with aluminium and any other barrier materials) and the polyolefin mixed stream (PP and HDPE caps). Several PolyAl recyclers are working on separating the LDPE film and aluminium as well as separating the PE and PP from the caps. New facilities have been built to separate the plastic part and the aluminium part and make them suitable for new uses. Currently, PolyAl is partly used in the cement industry, as fuel, or incinerated for energy recovery.

In the case of beverage cartons used for thicker dairy products, which account for about a quarter of all beverage cartons used, the larger amount of residual material in the packaging may cause problems in waste disposal. On average, thick dairy products (such as custard and yoghurt) result in about twice as much residual product as more liquid products such as milk and juices.[17] Beverage cartons used for thick dairy products place a higher burden on the water treatment facilities of specialised paper mills and may cause odour and pest problems, depending on the season. As a result, not all recyclers are willing to accept material from post-sorting. Innovations to prevent these problems are currently in the pipeline, such as preventive treatment after sorting and cooling.

3.5 Design for recycling

KIDV has defined a number of factors that influence beverage carton sorting and recycling. KIDV is working on a Recycle Check for beverage cartons. Until that time, the following factors can be taken into account in the development of beverage cartons:

Size

Packaging should be neither too big nor too small. As beverage cartons are sorted in the same way as plastic packaging, the same sizes also apply: no smaller than 3 cm and no larger than 5 litres. The E-learning module 'Sorting and recycling processes for plastic packaging' shows beverage cartons' journey through a sorting plant and illustrates why their size matters.

Recognisability

Beverage cartons are identified using Near Infra-Red (NIR). These NIR cameras are configured for a combination of cardboard and an outer layer of LDPE. If an NIR camera sees only cardboard, the packaging will not be sorted as beverage cartons. KIDV will conduct further research to give a proper indication of the conditions a beverage carton must meet to be recognisable as a beverage

[17] Thoden van Velzen, E. U., & Smeding, I. W. (2022). Recycling of Dutch beverage cartons. (Report / Wageningen Food & Biobased Research; No. 2275). Wageningen Food & Biobased Research https://doi.org/10.18174/567789. This view is corroborated by data from the KIDV Packaging Barometer.

carton using NIR. The results of this research will be included in the yet-to-be-developed Beverage Cartons Recycle Check and will partly determine the level of recyclability.

Product residue

Once the NIR camera has identified a packaging as a beverage carton, it is ejected into the right bin using a stream of air. If too much product is left in the packaging, the packaging is recognised but the ejection process is impeded. KIDV has commissioned research to determine the maximum amount of product that can be left in the packaging without hampering the sorting process.

It is also important in the context of reducing food waste to develop packaging in such a way that it minimises the amount of residual product, or purchase packaging that is developed in such a way. There are several ways to adjust the design so that a maximum amount of product can be extracted from the packaging. One example is to add perforation to make the top of the pack easy to open and empty. A possible drawback of this solution is that it could also cause people to stuff other packaging inside, which would cause more sorting problems.

Fibre content

A beverage carton contains mainly paper fibres. Paper fibre is currently the so-called target material in the recycling process. Optimising recycling efficiency therefore requires the packaging to contain as much high-quality paper fibre as possible. Our recommendation is therefore to keep the relative fibre content in the packaging or disposable unit as high as possible.

Barriers

Barriers affect the recyclability of packaging as well. However, they also positively contribute to the shelf life of the product, thus avoiding food waste. The entire life cycle of the product-packaging combination needs to be considered to weigh these opposing factors.

4. Circularity

Circularity is about closing the cycles in order to minimise leakage loss. The aim is to achieve the highest possible quality of materials. Materials used to produce beverage cartons (paper fibres, LDPE and aluminium) are suitable for foods during their first cycle. None of the materials are suitable for direct contact with food after recycling. A functional barrier is needed.

Like other paper and cardboard packaging, the fibres are exposed to a certain degree of degradation per recycling cycle. The fibres can be used between 7 and 25 times[18], after which they are no longer suitable for direct contact with food. A small proportion is reused in hygiene paper[19], for which no recycled application has (yet) been found. Recycling plants process most of the recycled fibre (over three-quarters) into (corrugated) cardboard packaging. This way, the fibre can undergo more *cycles* than in the one-time use of fibres in hygiene paper.

The rigid HDPE and PP of beverage carton caps can be reused in non-food products and packaging. See chapter 6, 'Bottlenecks', for further explanation of the reuse possibilities.

[18] More information: https://packagingeurope.com/news/new-study-suggests-cartonboard-can-be-recycled-25-times-without-loss-of-integrity/7752.article
[19] More information: https://hedra.h5mag.com/magazine_2017/wepa

5. Environmental impact

The environmental impact of packaging is determined by several aspects. The most important aspect is greenhouse gas reduction. Contributing factors include the choice of raw materials, the efficiency of packaging production and transport, whether or not the packaging is reused and the proportion of packaging that is being recycled.

A life cycle assessment (LCA) can be used to compare different packaging concepts for a given product. Based on research by the Institut fur Energie- und Umweltforschung, it can be concluded that the environmental impact of beverage cartons, expressed in terms of greenhouse gas reduction, is often lower than other currently available packaging solutions[20] for the same products.

The other relevant environmental aspects for beverage cartons are summarised below.

- Research by Wageningen Food & Biobased Research from 2013[21] shows that the collection and recycling of beverage cartons provides environmental benefits compared to processing at a waste incineration plant. The environmental gain correlates strongly with the amount of material collected. The environmental gain from beverage carton collection and recycling is broadly comparable to the environmental gain from plastic collection and recycling.
- The fibre used to produce beverage cartons is a renewable resource and comes from Forest Stewardship Council (FSC)[22] certified forests.
- Plastics can be either fossil-based or bio-based, and several beverage carton producers are already able to use the latter. For more background on this, please refer to the KIDV fact sheet on bio-based plastic packaging.
- Any packaging consumed outside the home is associated with the potential for litter, to the obvious detriment of the environment.

[20] In 2018, the FKN (Fachverband Kartonverpackungen für flüssige Nahrungsmittel, the German interest association) commissioned environmental research institute IFEU to perform LCAs on 1 and 1.5 litre beverage cartons for juices and milk. They compared beverage cartons to single-use bottles and to deposit bottles. This report has been validated by the Umwelt Bundesamt to ensure neutrality and then adjusted to the LCA published in 2020. The final conclusion of this LCA is that for juices, beverage cartons have a carbon footprint comparable to glass deposit bottles and a lower footprint compared to disposable PET. For fresh milk, beverage cartons come in at a lower carbon footprint than disposable PET and deposit glass. More information: report Institut für Energie- und Umweltforschung.

[21] More information: KIDV final report on beverage cartons pilot.

[22] More information: SIG - Certifications, Tetra Pak - Supporting sustainable forestry, Elopak - Sustainable forestry.

6. Bottlenecks

The choice of a specific packaging product is always dependent on multiple considerations. It is important to be aware of the bottlenecks associated with the type of packaging and packaging materials. The following bottlenecks currently apply to beverage cartons:

Acceptance

Thick dairy products (custard, yoghurt) result in more residual product than liquid products such as milk and juices[23]. As a consequence, some beverage carton recyclers do not accept the material from post-separation of Dutch beverage cartons. Product residue can also cause odour nuisance due to spoilage, depending on the season and storage duration.

Transport restrictions

As per the European Waste Shipment Regulation (EWSR)[24], certain waste shipment restrictions apply. These restrictions make it more difficult to move bales of waste material containing beverage cartons from post-separation. As there is no recycling capacity for beverage cartons in the Netherlands, they have to be exported and are subject to local procedures regarding the shipment and receipt of the waste in question. Only a limited number of paper mills are willing to accept beverage cartons under these conditions.

Recycling PolyAl

There are currently several recyclers in Europe that process PolyAl. Some of them are still in the development phase. The rigid plastics can be extracted from the material and reprocessed into products or non-food packaging. The different companies each have their own technique to separate the LDPE and aluminium to a greater or lesser extent. Some methods are already on the market and multiple uses of the resulting material are being explored. Other methods for recycling PolyAl are also being studied internationally but are not yet widely used[25].

The PolyAl stream that is not yet being recycled is partly used as fuel in cement kilns or incinerated for energy recovery. Processing in cement kilns offers an advantage for cement companies because the CO_2 emissions as a consequence of burning these secondary raw materials do not have to be counted in the LCA of the final product (NL-PCR Cement 2023). A secondary fuel is considered waste if it has not yet reached end-of-waste status at the time of entering the furnace. If so, the material has a EURAL code that has to be recorded during data collection and in the LCA report. According to EN 16908, emissions resulting from the incineration of waste and secondary fuels that

[24] More information: International waste shipment (EWSR): https://business.gov.nl/regulation/importing-and-exporting-waste-materials-evoa/

[25] More information: Recycling of Aseptic Beverage Cartons: A Review: https://www.mdpi.com/2313-4321/6/1/20

are classified as waste are allocated to the product system that generated the waste in question. Whether this was actually carried through in the LCA of beverage cartons is not known. CO_2 emissions at cement kilns do count in emissions trade, the Emission Trading System (ETS). Incineration of the PolyAl stream does not count towards the beverage carton recycling target.

New barrier materials

Alternative barrier materials are being explored, especially for long-life products, in order to reduce aluminium consumption. One example is the aforementioned development of a paper-based barrier layer. But other barrier materials such as EVOH (ethylene vinyl alcohol), SiOx (silicon oxide), AlOx (aluminium oxide) and PA (polyamide) copolymers are also being explored. The latter may create an additional complication in the recycling process, as the industry does not seem to be switching to a single alternative as of right now. This can make recycling more complex and result in a less uniform composition of the recovered material. This requires a careful balance to be struck between shelf life and recyclability.

Litter

Litter is an issue with all packaging of which the product is consumed outdoors. The monitoring of beverage cartons in litter by the Dutch Ministry of Infrastructure and Water Management indicates that the number of beverage cartons (small and large) in litter has been stable since 2021[26].

7. In conclusion

KIDV will continue to closely monitor developments regarding beverage cartons. This fact sheet will be updated as soon as the need arises. If you would like more information on packaging sustainability, please submit your question to the KIDV Helpdesk.

[26] https://www.rijksoverheid.nl/documenten/rapporten/2024/06/20/rws-memo-monitoring-drankverpakkingen-in-het-zwerfafval-resultaten-tm-geheel-2023

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for Sustainable Packaging
part of verpact

Background information

Wageningen Food & Biobased Research – Recycling of Dutch beverage cartons (only available in Dutch)

Thoden van Velzen, E. U., & Smeding, I. W. (2022). Recycling of Dutch beverage cartons. (Report Wageningen Food & Biobased Research; No. 2275). Wageningen Food & Biobased Research https://doi.org/10.18174/567789.

Trade associations

Netherlands: www.hedra.nl

Europe: www.beveragecarton.eu

Production of beverage cartons

Packaging booklet, Ten Klooster et al. – *Line aspects of beverage packaging*.

Facts and Figures by Extract

Beverage carton recycling facts & figures: www.extr-act.eu/wp-content/uploads/2024/01/ACE-Recycling_BROCHURE_Jan-2024_compressed.pdf