Netherlands Institute
for Sustainable Packaging

FACT SHEET

Inks

Printing on packaging

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Netherlands Institute
for Sustainable Packaging

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1 Introduction

Although ink only makes up a tiny percentage of the overall weight of a printed packaging, the application of inks can have an impact on the environment and people's health. The conventional inks that are printed onto packaging traditionally contain harmful substances. Additionally, inks can affect a packaging's recyclability. Inks with a low impact on people and the environment may still have a significant impact on the recycling process.

By being transparent about the application of inks and discussing the relevant contradictions and dilemmas, conscious choices can be made to make packaging more sustainable. In this fact sheet with checklist, the Netherlands Institute for Sustainable Packaging (KIDV) provides insight into printing on packaging in relation to the sustainability aspects.

The fact sheet was drawn up in collaboration with Evert Ouwerkerk from Design to Launch, a specialist in the design-to-print process.

What is this fact sheet about?

With this fact sheet and checklist, KIDV provides insight into the application and impact of inks in order to help businesses make well-thought-out and conscious choices regarding the printing on their packaging. Throughout the text, the word "ink" can also be read as "lacquer" or " varnish", provided that these - like ink - are used for decorative and informational purposes. Lacquers or coatings that are used as a functional barrier[1] have different properties. Consequently, these fall outside the scope of this document.

The document specifically illustrates the assessment framework for printing on packaging. This topic is most relevant for packaging made from paper, cardboard and plastic. Where necessary, the impact of inks is specified for other types of packaging materials as well.

Chapter 2 describes the different types of ink and printing techniques, while chapter 3 explores the impact of inks on people and the environment. Chapter 4 explains the connection between inks and the various sustainability aspects, i.e. the Rs on the sustainability ladder (Reduce, Resource, Recycle and Rethink). Chapter 5 is about regulations and certification. Chapter 6 contains a checklist.

[1] Functional barrier – an uninterrupted layer in the packaging that prevents or sufficiently reduces the transmission of unwanted/harmful elements under normal/intended conditions of use.

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For whom was this fact sheet created?

This fact sheet was written for the producers and importers of packaged products, their suppliers and consultants.

Disclaimer

KIDV created this document with the utmost care and attention. Nevertheless, we would greatly appreciate it if you would let us know if the document is incomplete or incorrect in any way. KIDV assumes no liability for any damage resulting from or related in any way to the use of this document.

2 Ink types and printing techniques

Different printing techniques require different types of ink. Consequently, there exist many different types of printing ink, including inks based on solvents or water, UV inks or special inks for digital printing. The quantities and ratios of the raw materials used in these inks vary wildly. Generally speaking, inks consist of four main components: pigments, binding agents, solvents and additives.

- Pigments are used to create visual effects and colour impressions.
- Binding agents ensure the pigments are evenly divided and bind them to the surface of the substrate[2].
- Solvents improve the fluidity and viscosity of the ink, related to the printing technique and the conditions.
- Lastly, additives change the physical properties of the ink to make them suitable for different situations, e.g. by improving the ink's binding, drying or scuff-resistant properties.

The substances used in the components and the ratios of the components themselves are tailored to suit the printing technique. Lastly, the drying method used also has a significant impact on the composition of printing inks. There are different drying methods (absorption, oxidation, polymerisation, evaporation).

Below are some examples, based on the most common printing techniques in the packaging industry:

- Offset printing is based on the principle that water and oil do not mix, so an oily ink can be transferred (offset) using a rubber blanket onto oily printing areas of the printing form. Non-printing areas retain water and repel the ink. The result is a sharp and high-quality printed image. Without further explaining the ins and outs of the technique, it is important to know that offset inks must be oily by definition and therefore contain a high percentage of (mineral) oils. Offset inks mainly dry through absorption/oxidation. This printing technique is commonly used for folding cardboard and labels.

[2] Substrate - The material that is printed on. The substrate's characteristics, such as its colour, clarity and opacity, affect the look of the printing image.

- Flexo and gravure printing are based on the principle that inks can be transferred onto smooth substrates (e.g. films) at a high printing speed. The inks must therefore have a low viscosity and be able to dry very quickly through evaporation. This is mainly achieved with the help of solvents and additives. In the packaging industry, flexo and gravure printing are mainly used for flexible packaging (films and labels). The printing often occurs directly from the roll. Due to the nature of the printing technique, the composition of flexo and gravure printing inks is markedly different than that of offset printing inks.
- UV inks (ultraviolet) are designed to dry through polymerisation. For this method, ultraviolet light is used to set off a photochemical reaction in the ink, causing it to harden extremely quickly. UV inks are suitable for the offset, flexo and gravure printing techniques. EB (Electron Bream) inks are a variant of UV inks. For these inks, the drying process is initiated by exposing the ink to an electron beam (instead of UV light), which causes the ink to dry quickly. By applying this technique, less energy is used during the drying process.

3 Impact on people and the environment

Traditional printing inks are currently produced in a linear system of (fossil) raw material extraction, use and disposal. Depending on the type of ink, the raw materials used are partly renewable and partly non-renewable. The non-renewable materials include fossil raw materials such as mineral oil[3] and pigments[4] made from e.g. selenium, cadmium, arsenic and chromium.
The extraction of the raw materials is also harmful for the environment.

It is a known fact that there are dangers to people and the environment during the production process (both the production of the ink and the printing process) due to the presence of volatile organic compounds[5] (VOC) in inks. The percentage of VOS depends on the type of ink, the drying process and the printing process. Solvent-based printing inks generally contain 40-70% VOC. UV/EB inks and water-based inks contain 0-5% VOC.

After the printing process, users may also be exposed to certain health risks. For example, mineral oil hydrocarbons (MOH[6]) can migrate from the ink to the packaged product. Mineral oil hydrocarbons can be found in both printing ink and in the recycled material. One example is printed paper and cardboard, the recyclate of which still contains ink residue.
To prevent MOHs from migrating and coming into contact with the product, a functional barrier in the form of a coating or film can be added to the packaging. These barriers fall outside the scope of this fact sheet.

In the context of this document, it is interesting to take a closer look at one of the causes: ink that contains MOHs. After all, if ink exists that is free of MOHs (or other harmful substances that may migrate to the packaged product), it is no longer necessary to include a functional barrier. Of course, this would require all printing companies to use MOH-free inks. Furthermore, it would still take a long time for inks that contain MOHs and other harmful substances to disappear entirely from the system.

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[3] Mineral oil is made from oil (petroleum).
[4] A pigment is a substance that absorbs certain colours of light and reflects others. Pigments are not or hardly soluble in water.
[5] "Volatile organic compounds" (VOC) is a collective term for a group of rapidly evaporating organic compounds. These are usually synthetic substances made from oil products. Examples in context include paint, inks, adhesives, solvents and cleaning agents.
[6] MOH: Mineral Oil Hydrocarbons (MOSH + MOAH). See also the KIDV fact sheet Mineral oils in packaging made from recycled paper and cardboard.(only available in Dutch).

During a packaging's recycling process, printing ink is removed from the substrate. For paper and cardboard, deinking is a separate process. For plastics, inks are removed during the washing process, during which other contaminants are also removed from the material.

The residual stream that is left after deinking or washing contains harmful substances resulting from the composition of the ink (pigments, binding agents, solvents and additives). The residual stream is disposed of as chemical waste and usually incinerated.

4 Connections to the R-ladder

The options for reducing the impact of printing on packaging on people and the environment or even implementing a circular system for it can easily be connected to a number of strategies on the R-ladder[7]. This chapter establishes these connections to, in order, Reduce, Resource, Recycle and Rethink.

4.1 Reduce

By reducing the number of print runs, the amount of ink used during setup, printing, cleaning and disposal can be reduced.

The package printing industry has been using the standard mixing colours cyan, magenta, yellow and black (CMYK) for years. Used together, these mixing colours form a full-colour image with a certain colour range, the so-called colour space. CMYK has a narrower colour space than what the human eye can perceive. The CMYK colour space is also narrower than that of RGB, i.e. the basic colours red, green and blue that are used to create a colour image on a display.

In the graphical industry, the colour space of the process colours CMYK is deemed to be too limited. In addition to CMYK, spot colours are therefore also used, particularly to print brand colours in a recognisable and consistent manner on packaging. There are currently around two thousand different spot colours.

The average package printing press has around eight colour stations. The printing press is generally set up to include the four basic colours (CMYK) and four interchangeable stations for spot colours and/or lacquer/varnish. This means that the machine has to be shut down after every package printing job to set up the interchangeable stations with different spot colours for the next project.

To do that, the colour stations have to be cleaned with a cleaning agent. This takes time and money, it is harmful to the environment and it poses health risks to the production staff, e.g. due to the presence of volatile organic compounds. Furthermore, the required spot colours are created in the printing company's ink kitchen before each printing job. Producing circa two thousand spot colours on demand requires eighteen basic colours, which must be in stock in the ink kitchen. Excess amounts of a spot colour are generally disposed of instead of being stored and reused, which means the extra spot colours have a greater environmental impact that standard colours.

[7] The R-ladder from top to bottom: Rethink, Reduce, Resource, Reuse, Repair, Recycle.

Using alternative colour systems can significantly reduce the impact of inks on people and the environment. Alternative colour systems are designed to offer a broader colour space by expanding the number of basic mixing colours. One example is CMYKOGV, where the O stands for orange, the G for green and the V for violet. If a printing press is permanently set up with seven mixing colours, it needs fewer interchangeable stations. This, in turn, results in less downtime and less cleaning.

The colour space of a CMYKOGV colour system has a range that is 90-95% comparable to the use of spot colours. In the printing industry, such alternative colour systems are known as extended colour gamut printing. In addition to saving on the use of spot colours, the ink consumption of the printing press is reduced by 25-30% when seven standard colours are used.

Table 1 shows a simple example of the process costs of package printing. In this example, the savings per print run are € 720, 60 minutes of time, 30 litres of ink residue and 75 litres of polluted cleaning agent.

	Money	**Time**	**Residue**
Key figures:			
Costs of the printing press/hour	€ 400		
Ink, per litre	€ 8.50		
Cleaning agent, per litre	€ 1		
Savings per print run:			
Washing the press, per colour	€ 130.00	20 minutes	
Ink residue, per colour	€ 85.00		10L
Cleaning agent, per colour	€ 25.00		25L
=	€ 240.00		
Total:			
x 3 colours =	**€ 720.00**	**60 minutes**	
Ink residue			**30L**
Polluted cleaning agent			**75L**

Table 1 Example of the potential savings per print run.

The multiplication is particularly interesting here: x the number of packaging projects per day, x the number of printing machines per printer, x the number of packaging printers in the Netherlands, Europe, the world.

Besides the transition to more efficient colour systems, there are also techniques that save ink in relation to the total ink coverage of the printed surface. Under Colour Removal is a good example of this. With this technique, the underlying colours CMY are removed from the darker areas of an image and replaced by more black. After all, the total ink coverage of a single colour can never be more than 100%, while making black with four different colours can easily result in a total ink coverage of circa 250-300%.

4.2 Resource

Due to the harmful components that eventually end up as (chemical) waste, printing inks produced in a linear[8] manner cannot be reused. As with biobased plastics, biobased inks could eventually contribute to the realisation of intrinsically sustainable packaging[9]. This is possible because, on the one hand, their environmental impact is reduced and, on the other hand, inks no longer contain any (harmful) substances that can create problems further down the chain.

Albeit at a small scale, some ink manufacturers have managed to make their printing inks biocompatible to a certain degree. These inks are made using mostly renewable raw materials and they do not contain any volatile organic compounds. Materials and chemicals are biocompatible if they are not harmful to ecosystems and can be safely incorporated into natural processes or new products. These inks can make a positive contribution to a less harmful residual stream after deinking or washing. They also represent a possible solution for biodegradable packaging.

To date, ink manufacturers have been unable to create a fully biocompatible printing ink. This is mainly due to the pigment component of the ink. Most raw materials used in pigment are not renewable or degradable. There are also certain differences between colours.

Black printing ink contains carbon black for colouring, based on soot. If it were possible to acquire the soot by e.g. burning coconut shells, black printing ink could theoretically become fully biocompatible.

If all printed products (not just packaging) were printed using biocompatible inks, that would also initially reduce and eventually eliminate the problem of MOHs (see chapter 3).

A printed product that combines substrate, inks, additives and printing process in a manner that does not negatively impact people, the environment or the economy can be seen as "clean printing".

[8] Linear production: based on raw material extraction, use and disposal.
[9] See the KIDV publication The State of Sustainable Packaging.

4.3 Recycle

Printing ink affects the recycling of a packaging. Simply put, it is about the extent to which ink can be removed from substrates such as paper, cardboard and plastic. For printing on glass and metal packaging, deinking is less of an issue because the inks are incinerated along with the packaging materials. Sometimes, the inks even serve as extra fuel during the recycling process of these materials.

The better ink can be separated from paper, cardboard and plastic, the cleaner and less coloured the recyclate will be. This results in high-grade recyclate with a quality that is more or less the same as that of virgin material. The extent to which a printed packaging can be effectively deinked depends on two parameters: the substrate and the type of ink. Below is a clarification based on the substrate category.

4.3.1 Paper and cardboard

Deinking paper and cardboard is a separate process based on the principle of flotation. The ink is separated from the fibres using chemicals and driven to the surface with the help of air bubbles. The floating layer of ink is skimmed off and disposed of as a residual stream.

To determine the extent to which a printed product can be effectively deinked, the International Association of the Deinking Industry[10] has developed a test procedure in collaboration with the European Paper Recycling Council[11]. This so-called INGEDE Method 11 leads to deinkability scores with the following ratings: Good, Fair, Tolerable and Not suitable for deinking.

A poor deinkability score does not necessarily mean the substrate in question is not recyclable. It merely indicates that the recyclate will contain more (grey) colour. This affects the value of the recyclate and its applicability. After all, the presence of residual ink in the material can mean it contains MOHs[12].

This is where a contradiction emerges with the inks from the aforementioned Resource strategy. One of the most important requirements of an effective deinking process is that the ink must possess hydrophobic[13] properties. Conventional printing inks - particularly those used for offset printing - contain fossil raw materials (such as mineral oil) that have hydrophobic properties. Such inks have good deinkability and contribute to high-grade recyclate. At the same time, these inks have a relatively high impact on people and the environment due to the percentage of harmful substances they contain. The reverse is also true: water-based inks have poor deinkability due to

[10] International Association of the Deinking Industry (INGEDE).
[11] European Paper Recycling Council (EPRC).
[12] See the KIDV Recycle Check for Paper and Cardboard Packaging.
[13] Hydrophobic substances are substances that repel water or are very difficult or impossible to mix with water.

their hydrophilic[14] properties. On the other hand, water-based inks contain fewer harmful and volatile organic compounds. In other words, it is about making conscious choices. When one opts to use printing inks that have good deinkability and therefore produce high-grade recyclate, this will still have a negative impact on people and the environment when it comes to volatile organic compounds and harmful substances in residual streams.

4.3.2 Plastics

When it comes to printing plastic, it is primarily about (single-layer and multilayer) films and labels. A single-layer film consists of a layer made of a single type of polymer (mono-material). A multilayer film consists of various layers that are combined into a film using adhesives, coextrusion or lamination. Contrary to paper and cardboard, deinking is not a separate process for plastics. Instead, it forms part of the washing process during which other contaminants are also removed from the polymers.

Single-layer packaging

In general, single-layer plastic packaging has good deinkability, provided that the printing is not enclosed between the type of polymer and a protective coating. Single-layer films are generally printed on the outside (surface printing) to prevent the ink from coming into direct contact with the packaged product. Since most inks are not scuff-resistant on the outside, a protective layer (varnish or laminate) is also added. Depending on its composition, this protective layer may affect the effectiveness of the deinking process.

Multilayer packaging

When one of the layers of a multilayer film contains printing, the ink is by definition not easily washable because it is enclosed between the different layers of the material. This means that, in addition to the difficulties involved in sorting and recycling multilayer materials[15], the recyclate will also retain more colour. When developing new packaging, there is traditionally more demand for virgin materials than coloured materials. As a result, coloured recyclate is less valuable.

A new development for multilayer packaging is the addition of delamination/deinking primers. These primers dissolve during the warm washing process (at a temperature of circa 85°C), which makes the different polymer layers easier to separate. The printed polymer layer that is also separated then has good deinkability during the washing process.

[14] Hydrophilic substances are substances that are easily soluble in water. In the context of deinking, this means that the pigments stay behind in the recyclate.
[15] See the KIDV Recycle Check for Flexible Plastic Packaging.

The deinkability scores used in paper and cardboard recycling are not used for the deinking of plastics. However, as with paper and cardboard, the residual stream that is left after washing contains harmful substances that are partly attributable to inks.

The printing on a plastic substrate also affects the quality of the recyclate in other ways. If the recycled substrate cannot be fully deinked, the ink (residue) may negatively impact the extrusion[16] of recycled plastics. The raw materials used in printing inks in particular are not suited for exposure to the high temperatures used during the extrusion process.

With regard to the sorting process, the choice of colour is another important consideration: a packaging that is printed almost entirely in black poses a problem when using NIR[17] technology to sort plastic waste.

Biodegradable plastics

There are separate requirements for the printing inks used to print on biodegradable or compostable plastics, e.g. regarding the inks' ecotoxicity and biodegradability[18].

[16] Extrusion - The process of shaping plastic by pushing or driving the material through a metal mould or other die.
[17] NIR (Near Infra Red) - Technology that is used during the sorting process that precedes recycling.
[18] European standard EN13432.

4.4 Rethink

When it comes to printing on a packaging, "the most sustainable method of printing is no printing at all". At the moment, this sounds like a utopia, but it certainly cannot hurt to take another objective look at the existing and often historically developed situations:

- Why are we printing on the packaging?
- Why are we using printing technique x rather than printing technique y?
- Are our assumptions about quality still correct?
- Does this packaging require this many print runs?
- Why are we using that metallic lacquer?
- What does the additional processing (laminate, lacquer, varnish, film) add to the product?

Answering these questions can help one look at packaging and their printing from an entirely new perspective. A practical example of Rethink is the natural branding of vegetables and fruit, whereby a laser is used to remove the pigment from the outer layer of the skin. The information that is "printed" with a laser replaces the printed labels that used to be put on the product. Such thought exercises can also lead to other R-strategies. Two examples:

- Snack packaging (films) are now printed using no more than four colours, whereas the usual six to eight printing colours were used before. Consumers did not notice this transition at all. → Reduce
- E-commerce shipping boxes on which only the logo is printed in the brand colour, whereas the bleed area used to be printed in the brand colour as well. → Reduce

5 Regulations and certification

There are no specific regulations for printing inks in the European Union. However, European regulations for food contact materials, such as packaging, do specify general requirements to protect consumers against the migration of potentially harmful substances to food[19].

The European Printing Ink Association[20] (EuPIA) has drawn up its own guidelines for the selection of raw materials for inks for (food) packaging. Raw materials that are classified as carcinogenic, mutagenic, reprotoxic or toxic are banned from use. This may concern pigments, solvents, binding agents and additives (see also chapter 2).

The EuPIA has drawn up an exclude list of materials, based on hazard classification and/or toxicological evidence, with the goal of protecting the environment and the health of employees and consumers. Ink manufacturers are free to choose whether they want to avoid or phase out the use of materials found on the exclude list; they are not under any legal obligation to do so. Avoiding or phasing out the use of these materials is a good first step towards making packaging more sustainable. The exclude list can serve as a baseline for this (see also chapter 6).

In addition to guidelines drawn up by branch organisations such as EuPIA, there are also several environmental labels that can help with the assessment of the printing and the substrate of packaging:

5.1 Cradle to Cradle (C2C)

Cradle to Cradle is a programme with multiple levels of certification that strives towards the continuous improvement of products and processes in order to realise a positive impact on people and the environment. The programme's broad scope is not limited to just printed, packaged products.
The certification programme evaluates a product on five categories of quality: quality of the material, reuse of the material, sustainable energy, water management and social justice. A product is assigned a performance level (Basic, Bronze, Silver, Gold or Platinum) for each of these categories. The lowest performance level of a category also represents the overall certification level. The standard encourages continuous improvement by awarding the certification based on increasing performance levels and requires the certification to be renewed every two years[21].

[19] See the KIDV file on food safety.
[20] See European Printing Ink Association (EuPIA).
[21] Examples of certified packaging can be found at https://www.c2ccertified.org/.

5.2 Blauer Engel

Der Blauer Engel (Blue Angel) is a certification that was introduced by the German government. Products and services that have received the Blauer Engel ecolabel are more environmentally friendly that other similar standard products and services. This certification is given out by the German RAL institute and it must be re-evaluated every three to four years. It was developed to help consumers with their purchase decisions. In the Paper & Printing product group, the label promotes the use of recycled paper and environmentally friendly printing systems and services.

The elimination of critical substances from all processed materials, from prepress to printing and post-processing, is evaluated. Furthermore, the reduction of emission of volatile organic compounds form inks, varnishes and cleaning agents during the production process is also taken into consideration. For printing inks specifically, one of the requirements is the use of inks that do not contain any mineral oil or cobalt. The label uses a holistic approach and also imposes requirements regarding deinkability.

In the context of this document, a downside of the Blauer Engel certification is that packaging are not certified. This is done to avoid the possible confusion among consumers regarding the connection between the certification and the contents of the packaging or the packaging itself[22].

5.3 EU Ecolabel

The EU Ecolabel takes a product's entire life cycle into account, from the extraction of the raw materials to production, distribution, use and disposal. There are specific criteria for printed paper. The category of printed paper includes newspapers, printed advertising material and newsletters, magazines, brochures, catalogues, books, flyers, posters, business cards and labels. Similar to Blauer Engel, the EU Ecolabel uses a holistic approach with regard to the different criteria (raw materials, harmful substances, recyclability including deinkability, emissions, waste, energy, fit for use). In certain specific categories, the EU Ecolabel is less strict than Blauer Engel, although the two share the major downside of excluding printed packaging from their scope[23].

[22] See https://www.blauer-engel.de
[23] See https://ecolabel.eu

5.4 Conclusion

When it comes to printed packaging, a Cradle to Cradle certification is currently the only relevant label. From the Silver level, the label is comparable to Blauer Engel and, to a lesser extent, EU Ecolabel. Overall, the criteria are less comprehensive than those of Blauer Engel or EU Ecolabel. For example, C2C does not consider deinkability or the release of volatile organic compounds during production and only takes the origin of raw materials into account in a non-binding manner. On the other hand, C2C employs a much stricter toxicological evaluation, which also includes recycling, incineration and composting. The Gold and Platinum levels are the only certifications that clarify whether a printed product is designed to be biocompatible. Other benefits of C2C are that it offers room for continuous improvement and that the certification is not limited to the EU. It is worth noting that none of the certificates contain any requirements regarding the (minimum) percentage of renewable raw materials[24].

[24] A more in-depth comparison of the aforementioned certifications and various others can be found at https://www.healthyprinting.eu. Healthy printing is an initiative of EPEA (Environmental Protection Encouragement Agency).

6 Checklist printed packaging

Making considered and sustainable choices with regard to printing on packaging requires insight into the effects of inks and their production processes. With the help of these insights, a choice can be made to focus on a specific strategy (Reduce, Resource, Recycle, Rethink) or - if possible - multiple strategies. For example, the Reduce and Recycle strategies can both be applied to printing on packaging. To give an example, folding cardboard can be printed offset using an alternative colour system with inks that have a "Good" deinkability score.

At the same time, certain contradictions force one to make more specific choices. Opting for recyclability (deinking in this context) is currently incompatible with the Resource strategy: inks with the best deinkability scores are the least biocompatible - and vice versa. Furthermore, it is always a good idea to critically re-evaluate the existing portfolio of printed packaging using the Rethink strategy.

Inks and printing processes that are compatible with all strategies have yet to be invented.
To provide businesses with the insight they need, KIDV has drawn up a checklist for printing on packaging.

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Checklist printed packaging

Question	Contributes to	Reference
Do the inks meet the "EXCLUSION POLICY FOR PRINTING INKS AND RELATED PRODUCTS" of the European Printing Inks Association (EuPIA)? ❑ With inks that meet the exclusion policy, there is a good baseline that can serve as a minimum requirement in order to choose one or more strategies.	People & Environment	Chapter 5
In addition to meeting legal requirements and employing an exclusion policy, has the packaging printer/ink producer implemented improvements that do not have a negative impact on people or the environment? For example: has a plan been devised to start using cleaner inks or further reduce the use of volatile organic compounds? ❑ The realisation of a circular system will require more than compliance with requirements and standards and not exceeding threshold values. Intrinsic improvements in this area have added value.	People & Environment	Chapter 3
If the packaging is printed in more than four colours, can the packaging printer offer alternative colour systems such as Extended Colour Gamut Printing? ❑ Such colour systems can make a significant contribution to reducing the use of ink and cleaning agents and therefore have a smaller environmental impact.	Reduce	Chapter 4.1

Paper & cardboard: Do the inks have an EPRC deinkability score in accordance with INGEDE Method 11? ❑ High scores contribute to effective deinking and therefore to the quality of the recyclate.	Recycle	Chapter 4.3.1
Single-layer plastics: Is the ink applied via surface printing without the use of coatings? ❑ Surface-printed ink on single-layer film can be washed off (deinked) if it is not enclosed between the film and a coating.	Recycle	Chapter 4.3.2
Multilayer plastic: Are delamination or deinking primers used? ❑ Delamination and/or deinking primers facilitate proper deinking, which results in high-grade recyclate. Deinking is not possible without the use of such primers.	Recycle	Chapter 4.3.2
Plastic: Are the inks suitable for extrusion? This is important if deinking was impossible or ineffective and the recyclate still contains ink residue. ❑ Inks that contain heat-resistant raw materials do not disrupt the extrusion process.	Recycle	Chapter 4.3.2
Plastic: Is the printing mostly black? ❑ Mostly black printing cannot be detected using the NIR technique during sorting. See also the KIDV Recycle Check for Packaging.	Recycle	Chapter 4.3.2
Does the packaging printer/ink producer have a Cradle to Cradle certification? (This can apply to both the ink and the substrate). ❑ Inks and/or printed products with a Silver, Gold or Platinum certification make a substantial contribution to biocompatibility.	Resource	Chapter 5.1

7 Afterword

Using inks to print on packaging affects the recyclability of the packaging. More information can also be found in KIDV's Recycle Checks. These consist of a decision tree with questions and background information that can be used to determine whether a packaging has good recyclability. KIDV Recycle Checks are available for rigid plastic packaging, flexible plastic packaging, paper & cardboard and glass. KIDV is currently developing a Recycle Check for metal packaging.

The Recycle Checks are updated annually. You can download the Recycle Checks from KIDV's website. This website also contains a wealth of other information about sustainable packaging, including a series of fact sheets about a wide range of current topics. These can be found in the library.
If you have any substantive questions about sustainable packaging, you can also consult the FAQ section.

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