

FoodDrinkEurope Guidelines on the safe use of paper and board made from recycled fibres for food contact use

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To be reviewed yearly

Disclaimer:

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What is the purpose of this document? Who is it aimed at?

This document is intended to illustrate best practice in relation to the use and selection of recycled paper and board for food contact packaging. It is aimed at individuals who have responsibility for ensuring the compliance of paper and board food packaging items with food contact legislation, for example Packaging Managers or Technologists, Technical Managers or Packaging Buyers. The purpose of this document is to encourage a “risk evaluation” to assess the suitability of a given item of recycled paper packaging, for use with a specific food product in given packaging format and also to encourage an appropriate dialogue between food producers and their packaging suppliers. The document provides the above individuals with guidance on the issues which should be considered in such a risk evaluation and provides links to a number of Regulatory and non-Regulatory standards, including industry best practice guidance.

FoodDrinkEurope Guidelines for the Use of Paper and Board made from Recycled Fibres for Food Contact Use

Forward

FoodDrinkEurope members seek to use the safest possible packaging materials. In this context we note that there is currently no specific harmonised EU legislation in place for paper and board. There is also no regulation similar to Regulation 282/2008 on recycled plastics. Hence, unlike for certain plastics, there are currently no legally defined or approved processes for recycling paper and board. While paper and board for recycling may be collected and sorted into various grades, food and non-food packaging are not segregated and can become mixed in the recycled waste stream. This has implications, since residues of substances used in non-food packaging inks may be unsuitable for food contact use. Even substances in food grade inks designed to be applied to the non-contact side of food packaging could potentially come into direct contact with food and give rise to migration, where food grade packaging is included within recycled board. We further note that de-inking processes for newsprint are currently not specifically regulated for food safety purposes and not consequently subject to related performance standards. In the long term, FoodDrinkEurope would like to see improvements in these areas, however we recognise that more knowledge and studies are required and that solutions are unlikely to be found quickly, if at all. Against this background, FoodDrinkEurope has developed this guidance in order to ensure the safety in use of recycled paper and board packaging for food contact.

1. Introduction and scope

Environmental legislation around the world has led to the collection and recovery of increasing amounts of packaging waste materials. As these collection and recovery systems have become better organised and more widely implemented, recycled paper and board has been more widely offered for use in food contact applications. There are significant pressures to use recycled materials wherever possible, for instance under the [EU Packaging and Packaging Waste Directive](#).

The Directive lays down minimum recycling targets for materials contained in packaging waste. The minimum targets by weight for preparing for reuse and recycling suggested by the Commission are set to 75% by 2025 and to 85% by 2030. Future standards for packaging are likely to include targets for minimum recycled content.

FoodDrinkEurope supports the increased use of recycled packaging; however food safety, legality and product quality should not be compromised.

Depending on the source of the recycled fibre and how it is prepared and treated, it is possible for recycled paper and board to contain substances at concentrations which may lead to unacceptable migration, thus rendering the recycled paper or board unsuitable for food contact applications. Examples include Di-isobutyl phthalate (DIBP) and mineral oils, which are covered in more detail below.

It is essential that food manufacturers, in conjunction with the packaging manufacturer, carry out a risk evaluation to determine the suitability of recycled

board in each particular application on a case by case basis. Such risk evaluation should take into account the nature of the food, the storage conditions, shelf life and the packaging format, including the presence of any functional barrier and the possible impact of any secondary / tertiary packaging, including recycled corrugated transit cases.

The purpose of this document is to provide FoodDrinkEurope members with guidance on the issues which should be considered in such a risk evaluation.

In the context of these guidelines “recycled” means all sources of recovered materials with the exception of re-used board mill production residues (so called “internal broke”).

These guidelines mainly cover the chemical safety of paper and board. Microbiological safety and quality aspects are briefly mentioned at the end of the document.

2. General Requirements for Risk Evaluation

The suitability of recycled board for food contact use is a matter requiring an expert judgment and should be carried out by a suitably qualified person. When considering whether or not a particular grade of recycled board is or is not suitable for a particular food contact application, food manufacturers shall also take into account the following:

- Compliance of the material with Article 3 of Regulation 1935/2004 with respect to the possible transfer of constituents to the food
- Compliance with the requirements of the GMP Regulation (EC) 2023/2006
- Compliance with other guidance or recommendations such as the [CEPI Good Manufacturing Practice for the Manufacture of Paper and Board for Food Contact](#) and
- [Industry Guideline for the Compliance of Paper and Board Materials and Articles for Food Contact](#)
- BfR Recommendation XXXVI or the Council of Europe Resolution RESAP (2002)(1)
- Any Declaration of Compliance (DoC) or other written evidence confirming suitability and fitness for purpose obtained from the supplier of the board
- Food Manufacturers shall carefully assess the nature of the food to be packed, the storage time (shelf life) of the product and the storage temperature to ensure compliance with Article 3 of 1935/2004/EC.
 - a. Some characteristics of foods require special considerations, for example: Aqueous foods, fatty foods or dry foods with high surface area will interact with recycled board in different ways. The potential for migration must be considered and controlled if needed. This may be achieved by careful selection of board grade or by use of a functional barrier.
 - b. Use of functional barriers requires specific detailed consideration and discussion with value chain partners. “Functional barriers” are defined in section 3 below. For the most effective solution the Food Manufacturer may be asked by the value chain to provide information on food characteristics, shelf life, and storage conditions.
 - c. Time and temperature parameters should be considered, particularly for products which are intended to be heated in or stored hot in paper and board packaging. Ovenable and microwaveable packaging is likely to require special consideration.

- Whether or not the board mill has in place control systems which identify the sources of the recycled material and is working to EN643, the European List of Standard Grades of Recovered Paper and Board. For example, unsorted post-consumer waste should not be used in any part of the construction for food contact packaging (it should be noted however that, while EN 643 lists the quality of fibres, it does not address chemical contamination).
- Any potential concerns arising from recycled components, such as for example non-food grade inks, which were not originally intended for food contact. Please see the “information note” and “guideline” on printing inks for food packaging which are available on the EuPIA website:
 - EuPIA Information Leaflet: [Printing Inks for Food Packaging](#)
 - EuPIA Guideline on [Printing Inks Applied to the Non-Food Contact Surface of Food Packaging Materials and Articles](#)
- Whether or not the recycling operation is subject to a quality control system (for instance the mill is ISO 9001 certified) to ensure that it is consistent, accountable and reliable. For example, processes should be documented, including cleaning methods and temperatures / times of the hot processes and records of analysis of board batches maintained.

It is strongly recommended that the food manufacturer should enter into a dialogue with the manufacturer of the recycled board and / or the converter. In most cases it will be necessary for the board manufacturer to be provided with all relevant information on the nature of the food to be packed, the storage time and temperature and the overall packaging format, including details of any liners which may be used and whether or not these would be considered to be a functional barrier (see below). The board manufacturer and / or the converter should then be asked to confirm (in writing) the suitability and fitness for purpose of the recycled board for the specific application.

Various grades of recycled board are available and the board supplier should be able to give advice on the suitability or otherwise of each grade for a particular food contact application.

3. Functional Barriers

The term “functional barrier” is defined in Commission Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food (See [Article 3](#) (15)).

Article 3, section 15 reads: *“functional barrier” means a barrier consisting of one or more layers of any type of material which ensures that the final material or article complies with Article 3 of Regulation (EC) No 1935/2004 and with the provisions of this Regulation;*”

Functional barriers could include polymer films or coatings such as PET or polyamides, metallised polymers and / or aluminium foil (note that films which may be barriers to oxygen or moisture may not necessarily prevent migration of other substances, such as mineral oils). Functional barriers can appear as a separate packaging layer, or can be applied on the reverse side of recycled paper and board packaging. All barrier materials, including coating materials must, of course, themselves be approved for food contact use.

Whether a barrier can be considered as functional should be determined on a case by case basis by testing. Metal or glass are absolute barriers and therefore recycled board would typically be suitable for secondary or tertiary packaging of foods packed in metal cans or glass jars. Note that some low density polyethylene or polypropylene films, whilst

they may be partial barriers to moisture, may not be significant barriers to volatile low molecular weight substances (including mineral hydrocarbons) which might migrate from either inks or recycled board. A risk evaluation should therefore be carried out.

Barriers are an area of current research and packaging manufacturers are working on the development of effective technologies with the dual function of retaining volatile flavours whilst reducing the migration of hydrocarbon based substances.

4. Specific substances and groups of substances to be considered:

In accordance with Article 3 of the Framework Regulation, a risk evaluation must consider any significant migration risk from other substances potentially present.

The process used to clean paper fibres for recycling is unlikely to remove residues of substances present as a result of previous uses of the paper fibres (for example substances used in coatings, varnishes, inks and adhesives). Therefore consideration should be given to the possible presence of wide range of substances, including, but not limited to photoinitiators (e.g. benzophenone and 4,4'-Bis(dimethylamino)-benzophenone), plasticisers (including phthalates), primary aromatic amines, bisphenol-A and diisopropyl naphthalene (DIPN). Limits for migration of the above examples are set by the [BfR Recommendation on Paper and Board](#).

The following are examples of substances and groups of substances which should also be considered:

(a) Di-isobutyl phthalate (DIBP)

In 2007 members of the European Federation of Corrugated Board Manufacturers (FEFCO) undertook a voluntary agreement to phase out the use of glues, printing inks and other products containing DIBP and to reduce the levels of DIBP in recycled paper. A target of 0.3 mg DIBP / kg food by 2011 was agreed by 9 industrial associations. FoodDrinkEurope understands that good progress has been made and that levels of DIBP in recycled paper are expected to continue to fall (ECHA-BfR presentation).

A reconfirmation of this phasing out of DiBP for cartons can be found in the ECMA recommendation on the safe use of adhesives for food packaging issued the 31 October 2014.

(b) Mineral oils

Mineral oils are a complex class of chemicals. Chemically, they can be sub-classified in many ways, for example by viscosity, carbon chain length or whether they contain aromatic molecules.

It is well known that mineral oils are present in recycled board produced from newspapers, as they are used as a liquid carrier phase for newsprint inks and in sheet fed offset printing inks. Printing inks containing mineral oils are unsuitable for food packaging. It is strongly recommended that special "low migration" inks be used for food packaging. Mineral oils are still used in industry, for example as lubricants and in antifoaming agents. While newsprint is believed to be a significant source of mineral hydrocarbons in recycled board, mineral oils from other sources, including environmental ones, may contribute to the contamination found.

Under certain circumstances, mineral oils can migrate from packaging into food. This depends on a number of factors, such as the nature and composition of the food, storage

temperature and time, other storage conditions (such as compression due to stacking) and whether or not a functional barrier is present between the printed carton board and the food.

Testing suggests that dry / non-fatty foodstuffs with a large surface area may be particularly susceptible to mineral oil migration from board packaging.

There is also evidence that mineral oils can migrate from corrugated outer cases containing recycled board. For this reason secondary and tertiary packaging containing recycled board should be considered in any risk evaluation.

In addition, food manufacturers should consider possible migration of mineral oils into raw materials / ingredients packaged in corrugated cardboard cases or cartons containing recycled board.

Different cases in recent years made clear mineral oil contamination can also originate from other sources throughout the entire supply chain.

In 2002 the Joint Food and Agriculture Organisation (FAO) / World Health Organisation (WHO) Expert Committee (JECFA) confirmed a temporary acceptable daily intake (ADI) of 0.01 mg / kg body weight for medium and low viscosity mineral oil. In 2012 JECFA withdrew the previously established temporary ADI. The existing specifications for mineral oil (medium and low viscosity) classes II and III were withdrawn pending a [safety assessment](#).

There is currently no EU Regulatory limit, although contamination with mineral oils would fall under Article 3 of the Food Contact Materials Framework Regulation 1935/2004.

The German risk assessment agency (BfR) has advised that migration of mineral oil from recycled carton board to foodstuffs should be minimised. Further information can be found in a [BfR Q&A document](#).

In advance of any formal legal measure the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) required the food packaging chain to take measures to minimise the presence of mineral oil in foodstuffs.

Currently German Authorities are working on a measure aiming to manage the migration of certain mineral oil components, presented in recycled packaging materials, into food products. At this stage there is no expected date for publication but more developments are expected in the course of 2016.

In June 2012 EFSA published a scientific opinion on human exposure through the diet to mineral oil hydrocarbons. The opinion identified *some potential concerns in relation to exposure to mineral oil hydrocarbons through food. However, [EFSA's experts stressed that there are several uncertainties regarding the chemical composition of MOH mixtures to which humans are exposed and also the wide range of sources of human exposure.](#)*

5. Microbiological and Quality Considerations:

Although this guidance mainly covers chemical safety, the microbiological safety of recycled board also needs to be considered. Recycled board is made by similar processes to virgin board and includes a cleaning and high temperature stage, which eliminates microbiological issues. Any issues with respect to microbiology are therefore the same irrespective of whether recycled material is used or not and are likely to arise from the storage conditions of the board before use.

Some foods, in particular dry products with a large surface area, can pick up taints very easily which, although not “unsafe”, may render the food inedible. In considering the suitability of recycled board for a particular food contact application, care needs to be taken to ensure that the board quality is appropriate to avoid taints which might affect the acceptability of the packaged product. (See article 3(c) of Regulation 1935/2004)

6. Legislative and other references:

(a) Legislation

Paper and board are not currently covered by any specific food contact legislation at EU level, but are regulated under the [Framework Regulation \(EC\) No 1935/2004](#).

Article 3 of Regulation 1935/2004 lays down general requirements for food contact materials as follows:

1. Materials and articles, including active and intelligent materials and articles, shall be manufactured in compliance with good manufacturing practice so that, under normal or foreseeable conditions of use, they do not transfer their constituents to food in quantities which could:

- (a) endanger human health; or
- (b) bring about an unacceptable change in the composition of the food; or
- (c) bring about a deterioration in the organoleptic characteristics thereof.

[Regulation \(EC\) No 2023/2006 on good manufacturing practice for materials and articles intended to come into contact with food](#) provides further clarification on good manufacturing practice applicable to all sectors and stages of the packaging supply chain, up to but excluding the production of starting substances. (This includes material and article manufacturers, their raw material suppliers, material convertors, packers and fillers, sellers and importers.)

All the above parties are required to establish and implement quality assurance and quality control systems and to maintain related records and documentation to demonstrate compliance with good manufacturing practice (and hence compliance with Article 3 of 1935/2004 before).

(b) Other (Non-Regulatory) References

(Note: the recommendations and guidance documents listed below should be read in conjunction with Regulations 1935/2004 and 2023/2006 in order to ensure compliance)

The German Federal Institute for Risk Assessment (BfR) issued an updated version of Recommendation XXXVI on paper and board for food contact on 1 July 2015 (Papiere, Kartons und Pappen für den Lebensmittelkontakt (Stand vom 01.07.2015)). A number of requirements and specifications are listed in the preamble. The Recommendation then lists the raw materials, additives, fillers and production aids which may be used in board for food contact. An unofficial English translation of BfR Recommendation XXXVI is provided via the following link:

<https://bfr.ble.de/kse/faces/resources/pdf/360-english.pdf;jsessionid=2EF95A4B046794B56BD2089BC50E8E2C>

The Confederation of European Paper Industries (CEPI) has produced an industry guideline for the compliance of paper and board materials and articles for food contact. CEPI has also produced a Good Manufacturing Practice (GMP) document for the manufacture of paper and board for food contact. Both of these CEPI publications can be accessed from the CEPI website:

<http://www.cepi.org/system/files/public/documents/publications/foodcontact/2012/Industry%20guideline-updated2012final.pdf>

[http://www.cepi.org/system/files/public/documents/publications/foodcontact/2010/Good%20Manufacturing%20Practice%20\(GMP\).pdf](http://www.cepi.org/system/files/public/documents/publications/foodcontact/2010/Good%20Manufacturing%20Practice%20(GMP).pdf)

The CEPI industry has produced guidelines on the European List of Standard Grades of Paper and Board for Recycling (EN 643 revision 2013), which are available in the following link:

http://www.cepi.org/system/files/public/documents/publications/recycling/2013/CEPI_EN%20643_brochure_FINAL_0.pdf.

Please note that the EN 643 is available through the respective national standardisation bodies:

<http://shop.bsigroup.com/ProductDetail/?pid=000000000030265770>.

This standard defines grades and combinations of acceptable types of recovered paper for collection and sorting operations.

The European Carton Makers Association (ECMA) issued a good manufacturing practice guide in September 2011, which was updated in December 2013.

<http://www.ecma.org/uploads/Bestanden/Publications/GMP/UK%20GMP%20%20Version%201.1%20%2016%2012%202013%20%20-%20FINAL.pdf>

EuPIA Document: Recyclability of printed paper and board articles for use in primary food packaging (Document reference: PIFOOD, 2009-02-04). Available from EuPIA website:

http://www.eupia.org/index.php?id=31&tx_edm_pi1%5BshowUid%5D=22&cHash=d1ebf8ec2b67c2be06485d2c8c40fb77

In 2002, the Council of Europe Committee of Experts on Materials Coming into Contact with Food drafted a Resolution on paper and board materials intended to come into contact with foodstuffs (RESAP (2002) 1):

http://www.coe.int/t/e/social_cohesion/soc%2Dsp/public_health/food_contact/PS%20E%20PAPER%20AND%20BOARD%20Version%203.pdf

This was an interesting and useful document, but has not been updated for many years.

ECHA – BfR presentation on Phase-out of di-isobutyl phthalate in food packaging made of recycled paper and board:

http://echa.europa.eu/documents/10162/21931216/pfaff_substitution_webinar_en.pdf