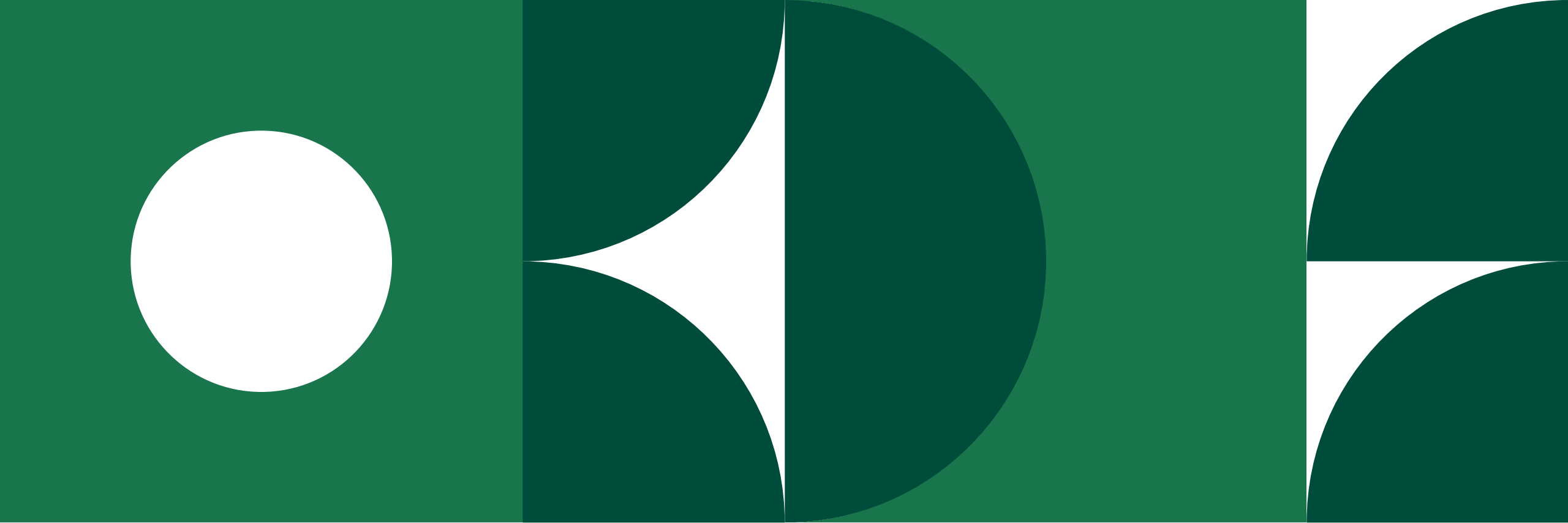




Safety of virgin paper and board according to Industry

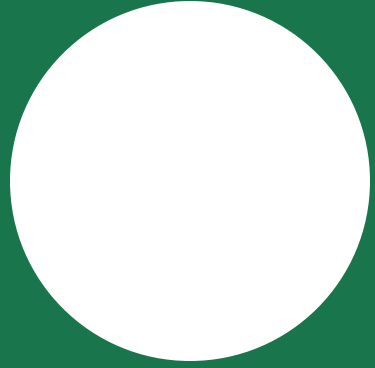
Sigrid Gerold on behalf of CEPI and CITPA – 12th EFSA FCM Network meeting
21st & 22nd October 2025

Guiding documents

- CEPI/CITPA Food contact guidelines for the compliance of paper and board materials and articles http://www.citpa-europe.org/sites/default/files/Food%20Contact%20Guidelines_2019_final.pdf
- CEPI Guideline on good manufacturing practice for the manufacture of paper and board for food contact <https://www.cepi.org/updated-good-manufacturing-practice-gmp-guidelines-for-the-manufacture-of-paper-board-for-food-contact/>
- CEPI Eurokraft / EUROSAC Food Contact Guideline https://www.eurosac.org/fileadmin/pdf/pdf_food_contact/2025_Food_Contact_Guideline_EN.pdf
- ECMA Good Manufacturing Practice for Food Safety <https://ecma.org/industry-topics/guidelines-and-gmp/ecma-good-manufacturing-practice-for-food-safety/>
- FEFCO Good Manufacturing Practice (GMP) standard <https://www.fefco.org/sites/default/files/2020-2019/March/FEFCO%20GMP%20FINAL%202020.pdf>
- PIJITF GUIDANCE Information and Transparency in the Printed Food Packaging Supply Chain https://www.eupia.org/wp-content/uploads/2025/03/PIJITF-Guidance-on-Information-Flow-and-Transparency-in-the-Supply-Chain_Final-March-2024.pdf
- EDQM Technical guide on documentation supporting compliance and safety of food contact materials and articles – 1st edition, 2024 [Documentation supporting the compliance and safety of food contact materials and articles - European Directorate for the Quality of Medicines & HealthCare](https://www.edqm.eu/en/paper-and-board-used-in-food-contact-materials-and-articles)
- EDQM Paper and board used in food contact materials and articles <https://www.edqm.eu/en/paper-and-board-used-in-food-contact-materials-and-articles>
- CoE Resolution CM/Res(2020)9 on the safety and quality of materials and articles for contact with food <https://rm.coe.int/09000016809fe04a>
- EuPIA documents on the use of printing inks on food contact materials and articles <https://www.eupia.org/key-topics/food-contact-materials/general-overview-of-fcm/>
- BfR Recommendations on Food Contact Materials <https://www.bfr.bund.de/service/datenbanken/bfr-empfehlungen-zu-materialien-fuer-den-lebensmittelkontakt/>
- BfR Methodensammlung Papier, Karton und Pappe <https://www.bfr.bund.de/service/datenbanken/bfr-empfehlungen-zu-materialien-fuer-den-lebensmittelkontakt/methodensammlung-papier-karton-und-pappe/>

Ensuring safe products involves:

1. Baseline
2. Risk management and raw material selection – Paper and Board
3. GMP – Paper & Board
4. Process monitoring and control – Paper and Board
5. Risk management and raw material selection – End product
6. GMP – End product
7. End product testing
8. Summary



1. **Baseline**

Paper and board in Contact with food – The applicable laws

- **Regulation EU 2023/2006**

- In the case of the paper and board sector, Good Manufacturing Practice (GMP) guidance must be further subdivided to suit each major part of the supply chain.
- Sector-specific GMPs in elaborated in sectors' specific guidelines
 - CEPI => paper & board for food contact
 - EuPIA => printing inks
 - ECMA => folding cartons
 - FEFCO => corrugated board
 - FEICA => adhesives

- **Regulation (EC) No 1935/2004**

- Article 5: No specific measure for paper and board (P&B)
- => Importance of **national specific measures:**

Positiv lists: Germany (BfR XXXVI, /1, /2, /3), Italy (DM of 21.03.1973) , Netherlands (Warenwet), Belgium...

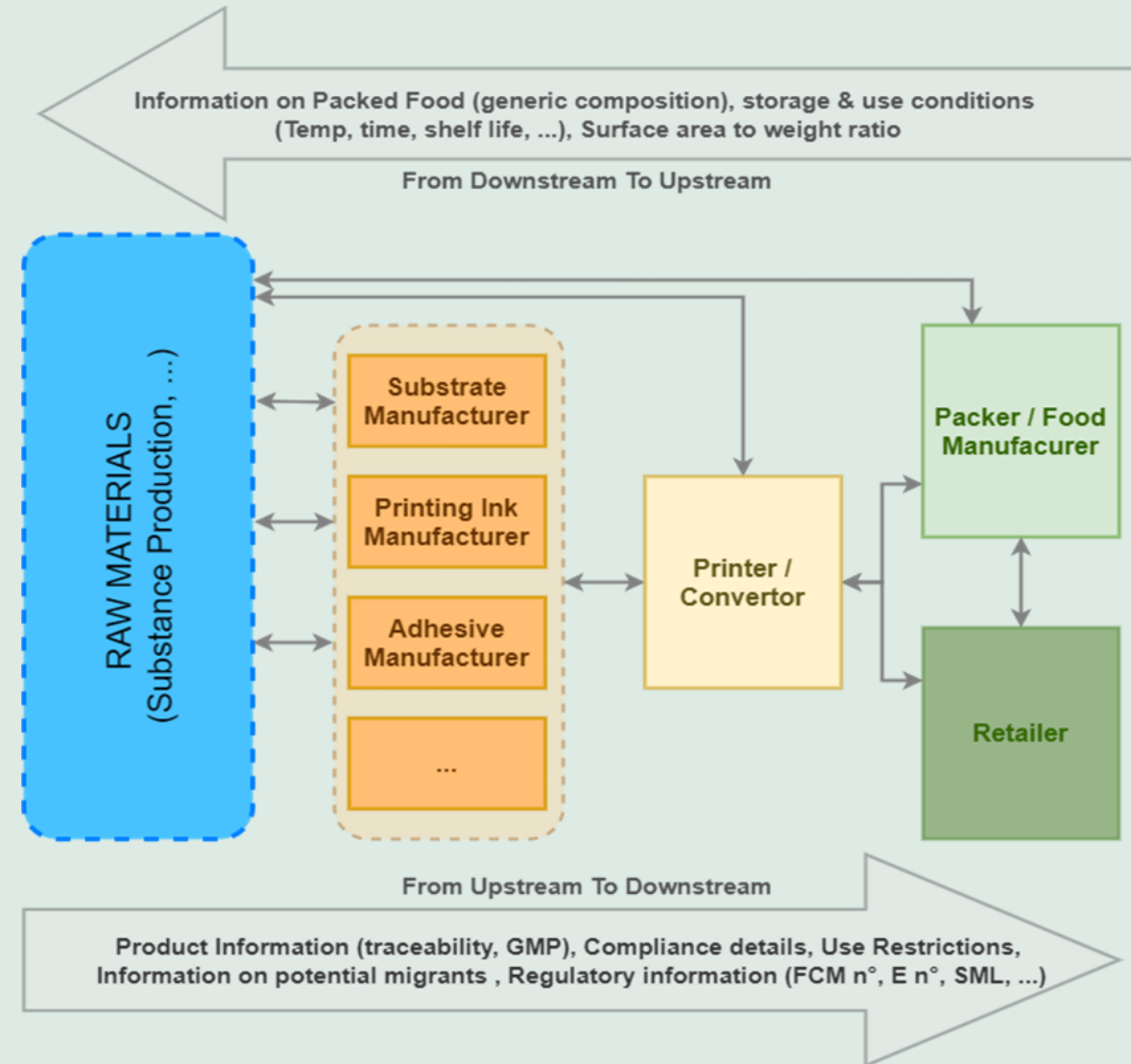
Substances listed differ between these documents, and/or there are variations in their limits and restrictions.

Purity and/or Migration Requirements: France, Greece et al.

Product design & Value Chain communication

Basic considerations:

- What is the intended purpose of the packaging?
- What is the intended food contact?
 - Dry, non-fatty
 - Moist (acidic, alcoholic)
 - Fatty
- Temperature and time (production and storage)
- Volume / Surface ratio
- Design of packaging
- Target market





2. **Risk management and Raw material selection – P&B:**

Risk management – Chemicals and Fibres for virgin P&B:

Chemicals risk assessment on food contact suitability is **based on supplier information** at the P&B producer on:

- **Suitability for FCM products** (avoid CMR, genotoxic substances)
- **Suitability for certain food contact** applications (reliable tox data on safe use etc.)
- Consideration of **restrictions for use** for food contact applications
- **Composition** and **potential migrants (IAS)**
- Information on **purity requirements** (incl. **NIAS**).
- Reference to applicable food contact **positive lists**

In practice: Information exchanged via pages long questionnaires between suppliers and papermills

Pulp risk assessment based on:

- Wood fibre **origin**
- Wood fibre **quality**
- **Pulp production** process
- **Bleaching** process

In practice: All sources of virgin fibres are traceable

Risk management – NIAS in P&B:

2 groups of NIAS:

1. Substances whose **unintentional input is introduced via the fibre raw materials** (e.g. naturally occurring resin compounds in fresh fibres) – can only slightly be influenced in advance.
2. Substances whose **unintentional input can be managed via the production process** (GMP) (e.g., impurities by purification; reaction products or decomposition products of intentionally used production aids or refining agents or other additives by optimized production process)

Supply chain communication is essential part in reducing the risk from NIAS.

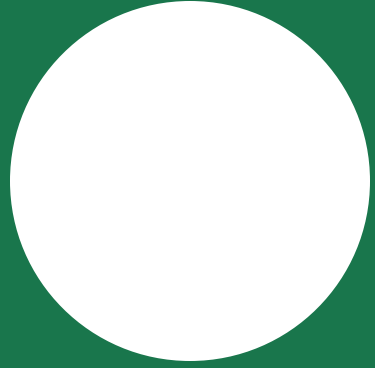
Material selection – P&B recipe development:

P&B recipe developed under consideration of final application and use conditions

Based on:

- **Compositional requirements** coming from relevant regulatory documents
- **Supplier information** on raw materials
- **Worst case calculations** under consideration of limits and experience on migration
- Detailed **formulation checks** at independent external laboratory (if needed)

The actual qualification of the recipe formulation is only verified through analytical testing of the product



3.

GMP – P&B:

GMP – Traceability:

- Procedures are implemented, which allow to connect output of materials and articles to incoming raw materials and additives.
- Difficult for papermaking operators: continuous production process

Traceability done according to technological feasibility



4. **Process monitoring and control – P&B**

Migration / Extraction tests on P&B

Ensurance of process compliance and safety of products done by **routine sample testing** (periodic purity testing for target contaminants on random samples from production):

1. Simulation of transfer (migration, transfer via gas phase, extraction)
2. Analyses on specific substances

Due to the use of variable organic and other natural materials, the cellulose pulp as raw material and the porous structure of the product, regulatory regimes designed for plastic, based largely on chemical formulation and migration testing, have less relevance when applied to paper and board materials and articles.

- Usually no contact with liquid food => migration testing with **liquid simulants** is **not appropriate** (absorption and penetration of simulants into the P&B matrix or disintegration of the sample)
- **Liquid simulant testing** is an extraction rather than reflecting a migration from the food contact side => **significant overestimation** of migration for most applications (there may be exceptions, such as filter papers)

Polar solvents have the ability to swell the fibres and dissolve/release substances which are normally tightly bound to the fibre surface and therefore have a low potential for migration

Modified Polyphenylene Oxide (**Tenax®**) is the **only known simulant** that can be applied to P&B for the purpose of performing a **one-sided migration test** simulating a real food contact situation for typical uses. (Exception: filter papers and tea bags)

Paper industry would need specific procedures and simulants for one-sided migration testings

Tests on P&B – Methods 1

JRC– Techn. Report on “Testing conditions for kitchenware articles in contact with foodstuffs: [...] paper & board”

1. P&B including a barrier layer against fat/grease/water and not absorbing moist and/or oil and **not losing its physical structure**

Migration tests under conditions prescribed by (EU) 10/2011

2. P&B not withstanding test conditions from (EU) 10/2011

Conditions as set in Table 5B: **Extracts** with **water, isooctane** and **95% Ethanol**

=> might easily lead to an **overestimation**

Tests on P&B – Methods 2

Method collection for the examination of paper, cardboard and paperboard for food contact supplements BfR recommendations with **determination methods**.

https://www.bfr.bund.de/de/methodensammlung_papier_karton_und_pappe-32620.html

BfR "**Guideline for testing the mass transfer of consumer articles made of paper, board and cardboard**" provides guidance on the selection of suitable methods for simulating mass transfer.

<https://www.bfr.bund.de/cm/343/untersuchung-der-stoffuebergaenge-von-bedarfsgegenstaenden-aus-papier-karton-und-pappe.pdf>

Standard	Title	Extraction/Migration	Food
EN 645:1994	Cold Water Extract	10 g of cut paper in 250 ml of water (suspended) at 23 °C and incubated for 24 h under gentle shaking	Aqueous food in direct contact at RT
EN 647:1994	Hot Water Extract	10 g of cut paper in 250 ml of boiling water (suspended) at 23 °C and incubated for 2 h in a water bath at 80 °C under gentle shaking	Aqueous food in direct contact hot
EN 14338:2004	Migration using modified MPPO as simulant	MPPO, 60 – 80 mesh; 1 dm ² paper in a petri dish in direct contact with 4 g MPPO; time and temperature should match the foreseeable usage conditions; extraction of MPPO with 2 x 20 ml solvent	Dry, non-greasy food, hot contact (baking paper)
EN 15519:2008	Organic solvent extract	10 g of cut paper (suspended) in 250 ml of solvent (isooctane, 95% EtOH) and incubated for 2 h at 20 °C or 24 h at 20 °C (long term storage); for hot contact choose 2 h at 60 °C.	Direct contact to greasy food / lipophilic substances

Various additional methods and test conditions for specific limits are defined at European national level, with varying surface/food ratios.

Industry's Safety Assessment for P&B

Tests selected under consideration of food type, storage time, filling, storage and handling temperature, surface/ food ratio...

Examples of performed tests:

- **IAS** under consideration of **quantitative restrictions** in national and European Regulations
- **NIAS** according risk assessment; Examples: residual monomers in wet strength resin and retention aids;
- **Aluminium** migration (migration into foodstuffs must not exceed 1 mg/kg – if required for food contact)
- **Metals**
- **OBA** and **Colour-fastness** (DIN EN 648, DIN EN 646)
- **Sensory** neutrality (no deviation of taste or odour imparted from the FCM to food (DIN EN 1230-1 and -2; DIN 10955)
- Determination of the transfer of **antimicrobial constituents** on food; (test acc. DIN EN 1104: "Hemmhof")
- Suitable microbiological purity (if required – taking into account the intended use and the specific hygiene requirements)

Testing is also done with representative food

As detailed knowledge of the raw materials, formulation and production process is required, only the P&B producer can evaluate the suitability and safety of a P&B product for a defined intended use in food contact under specified conditions.

Subsequent members of the supply chain must rely on the information provided by the P&B producer.



5. **Risk management and Raw material selection – End product**

Risk management – @ P&B Converters Compositional requirements

Printing inks , Varnishes and Lacquers* for food packaging applications:

Optimized Printing ink **for food contact materials: Low migration** inks and varnishes used when required by the risk assessment.

Statements of Composition (SoC) from suppliers

Adhesives for food packaging applications:

Optimized for intended application

SoC from suppliers

Multi-material multi-layers: “Plastic coated and laminated papers and boards”

- Plastic layer laminated or coated on a paper web => (EU) 10/2011

Component selection at Converters

Selection of raw materials (paper, board, inks, varnishes, lacquers etc.) under consideration of final application and use conditions:

To ensure safety:

- **Compliance assessment** of used **raw materials**
- **Risk assessment under consideration of** production process, product design, intended end use application and supply chain conditions
- **Worst case calculation** and (if required) **testing**

Safety evaluation done following **underlying regulatory documents** and best practice documents and guidelines **from the relevant industrial sectors**

Non-harmonised specific requirements for components and finished products are a challenge



6. **GMP – End product**

GMP – End product

Assessment of compliance with compositional limits (overall and specific limits) for each finished product manufactured is often difficult, given the range of packaging scenarios and food contact materials =>

- a **'family approach'**, whereby all products within a suitable defined product family are considered to comply;
- a **'building blocks'** concept where evidence of compliance with applicable restrictions for a number of products, **using similar materials or combinations of materials**, are considered to apply. This building blocks concept is seen as the core safety approach converters must implement provided that end use conditions are efficiently covered.

Testing frequency: based on a risk assessment and relates to the likelihood of a particular restriction being exceeded.



7. **End product testing**

Industry's Safety Assessment on converted P&B FCMs

Assessment of **information** from **suppliers** of paper, board, plastics, inks, varnishes, glues/adhesives, etc.

+ **Information** on intended **food contact application**

+ potential **restrictions**

+ **built-up** of product

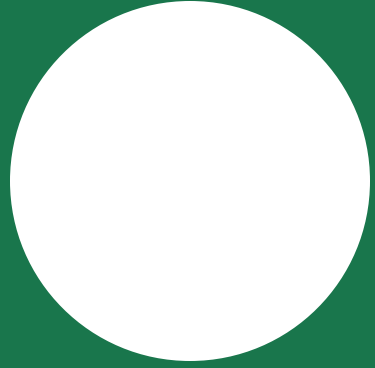
- ***Worst-case calculated*** for migration – based on suppliers' information on IAS and NIAS – assuming 100% transfer to food.
- Only if a substance is suspected to migrate above recognized limits, specific migration is tested
- ***Non-targeted screening*** analysis for the detection and identification of potential migrants from the finished product (impurities, reaction or degradation products)
- ***Sensory testing*** acc. to EN 1230-1 and EN 1230-2

Declaration of Compliance (DoC)

- In the case of paper and board, for which no specific measure exists currently a DoC is not strictly legally required until a specific measure is in place

In practice:

A **document** is provided for the final product stating the **suitability for food contact applications** including any **restrictions for use**, potential **migrants** (deliberately added substances only) and information on purity requirements (including known **NIAS**, when relevant).



8. **Summary**

Regulatory challenges for P&B-FCM

- No harmonized EU regulation for P&B, inks, varnishes, lacquers, adhesives available
- Patchwork of national legislations, each with its own specific requirements, interpretations, and testing methods leads to additional workload and expenses; additional uncertainties with testing laboratories hindering the intra-EU flow of goods
- Language barriers due to national regulations
- Inconsistent and even non-feasible procedures and testing methods across Europe
- Not justified references to non-applicable legislation, such as Regulation (EU) No. 10/2011 for plastics add to confusion when abused for P&B

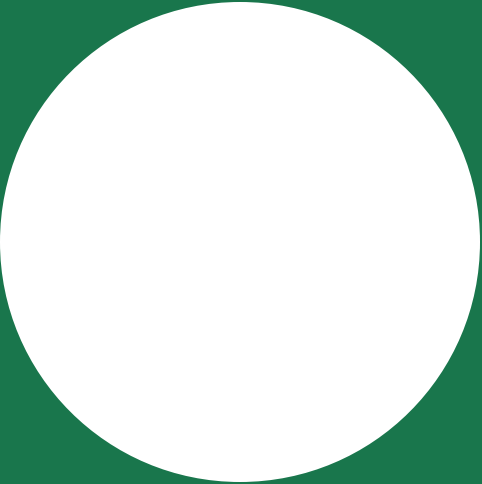
How to ensure safety of virgin paper and board and converted products thereof according to Industry?

- Ensure communication within the supply chain
- Create product recipes with regulatory restrictions and intended use in mind
- Get as much information from raw material suppliers as possible
- Evaluate the information carefully and select raw materials accordingly
- Observe limits in the formulation
- Know your production process and monitor it (GMP, GHP)
- Do worst case calculations
- Test migration with food simulants if risk assessment requires it
- Test migration into food if reasonable
- **USE COMMON SENSE and COMMUNICATE!**

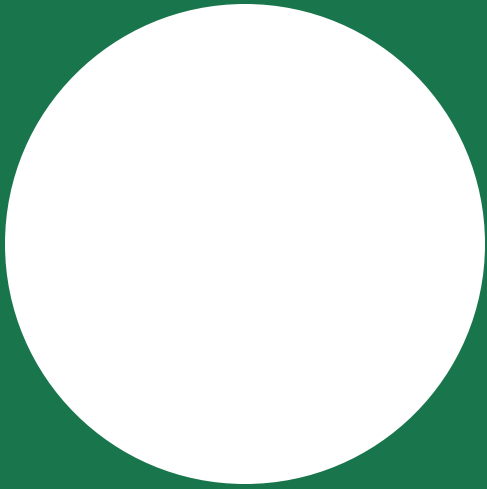


The European Paper & Cartonboard industry has continuously asked for a harmonised legislation for paper and board on EU level.

The revision of the FCM regulation is not only justified but urgently needed!



Any questions?



Contact:

MM

Dr. Sigrid Gerold

Head of Group Product Safety &
Quality @ MM Group

sigrid.gerold@mm.group