LABEL ACADEMY

MASTER CLASS

FLEXIBLE PACKAGING

Flexible Packaging

Migration testing and quality control

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NAPG

Flexible Packaging

- Sensitive Packaging
- Migration testing
- Quality control

Sensitive Packaging

Sensitive Packaging

- Folding Carton
- Flexible Packaging
- Label Packaging

Low Migration

- When considering sensitive packaging, the term “Low Migration” is often used to designate that the movement of substances is minimal or below some set standard and does not cause off taste and/or off odor.

- Governing bodies and Multi-national companies are looking at global sensitive packaging standards.
- This help will limit the amount of migratory chemicals allowed on the packaging of food products.

Regulatory bodies

- GIO
- FDA
- CFIA
- EuPIA
- Nestle
- Swiss ordinance
- Etc.

Governing bodies and Muti-nationals, brand owners etc. are setting standards

Printed packaging design

- It is imperative to design Printed food packaging to be printed so that they are able to control potential sources of migration, which can include:
    - contamination during print production and print handling
    - set-off migration in stacks and reels
    - storage, transport and end use consumers
    - The selection of materials and barriers with suitable functional properties also need carefully considered.

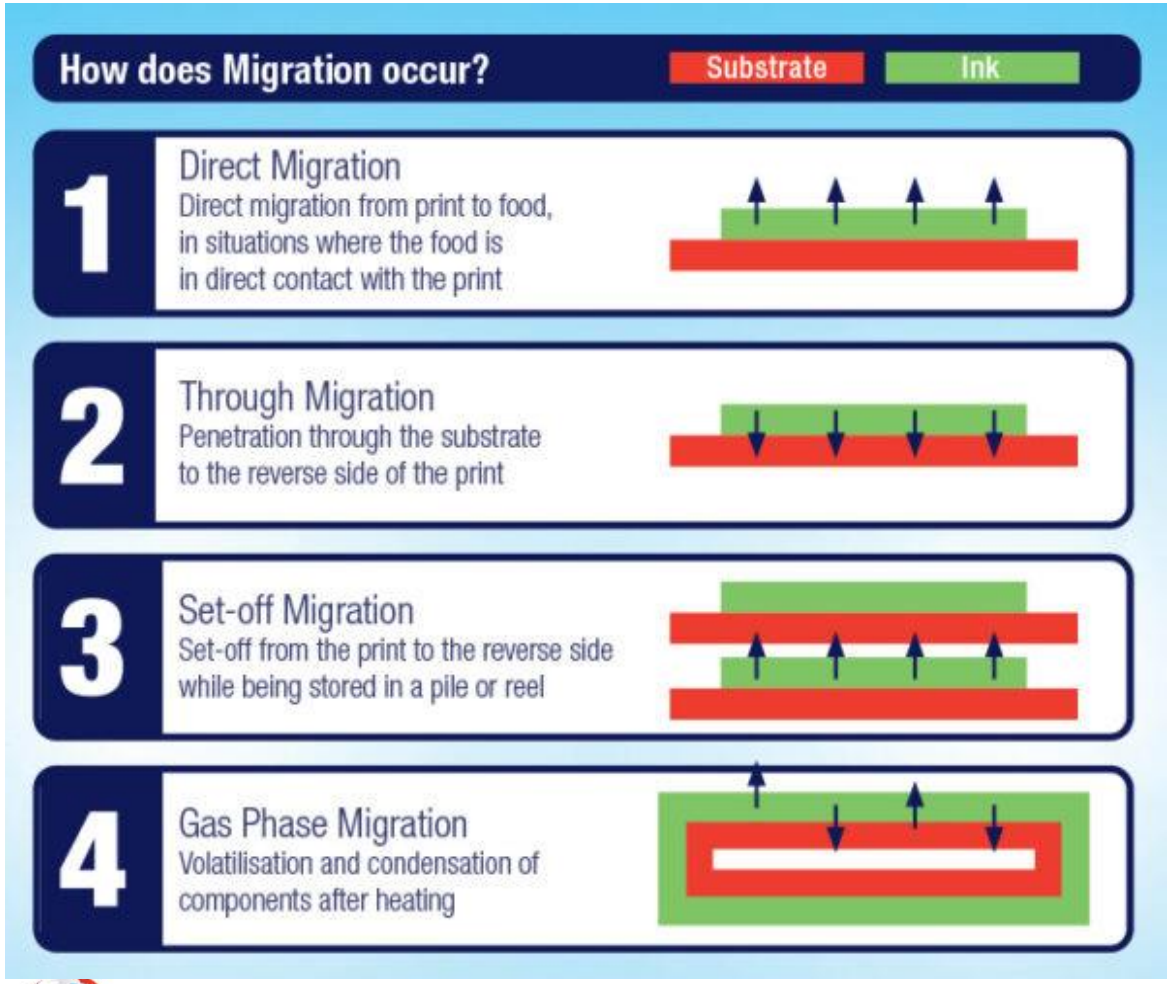
It is important to have the entire supply chain in compliance

Migration testing

Risk Assessment for Migration

- Migration Risk Assessment
- Implications on Packaging Design
- Where the design, production, storage or use of packaging includes a risk of transfer of substances from printing inks and consumables into the packaged product, there is a need to make a risk assessment and address potential issues so that the packaging will meet the legal requirements not to transfer components to the contents in quantities which could cause harm or affect their properties.
- For risk assessment the most severe time and temperature conditions the food contact item will be subjected to over entire shelf life must be considered.

Potential sources migration



- Inks, coatings, adhesives.
- Press cleaners, offset founts
- Substrate; film or paper
- Environmental contaminants
- Storage and transportation

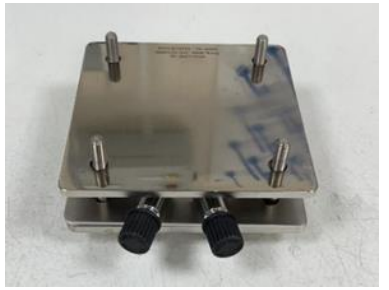
Monitor the entire supply chain

Migration testing activities

- Migration testing protocol ; plastic (PP and PET)
- 95% Ethanol, 10 days exposure in migration cell (PE contact sheet for PET)
- 40°C and 60°C (EU plastics regulation, long term storage)
- Surface print (PP) ; simulant in contact with reverse unprinted side of the film
- Reverse print (PET) ; EuPIA guidance for lamination simulation ; 10 day set-off conditioning at ambient temperature at 1kg/dm2 pressure, interleafed with PE film sheet

Per conditions of use – temperature, time, food simulant liquid

Migration testing protocol



- Migration testing protocols ; paper
- Tenax dry food simulant
- 40°C, 10 days exposure
- Simulant in contact with the reverse unprinted side of the paper

Quality control

Preliminary QC testing

- Along with standard testing to ensure adequate and consistent cure of the printed materials, such as color consistency, cure, adhesion, drying, rub/scuff resistance, gloss, COF etc. must show good consistent results to justify additional instrumental testing for migration.

Migration SML

- Migration vs Specific Migration Limits (SML) according to the EU model (1Kg food in 600cm2 packaging) and reported as ppb migrated into the simulant vs the SML.
- Set limited based on end use, barrier properties etc.
- <10 ppb
- 10-50 ppb
- >50 ppb

Note ; 60°C testing protocol is the worst-case scenario.....

Printed samples are prepared in migration cells compliant with relevant regulations and brand owner requirements.

- Separate EU and NA requirements

Test protocol needs to be determined either based on ‘worst case’ – 10 days/60°c or on end use application using conditions

- *E.g., samples intended to be laminated, are samples shrink sleeves or in-mold labels that would normally have a functional barrier between inks and food simulants used?*

After the incubation period samples are extracted and concentrated as needed ready for analysis

- *What migrants to test for?*

NIAS Assessment

- NIAS is a collective term for any impurities/contaminants/byproducts/decomposition products
- Analysis is carried out in the same way as migration with GC and LC techniques, but results are usually estimated semi-quantitatively – based on the response of an internal standard
- Recommend screening raw materials for NIAS during product development
- We are not always informed by the supplier of potential impurities and residuals in the material
- NIAS are usually present at low level higher concentrations in the raw material make for more accurate detection and identification
- NIAS helps to inform migration testing – helps to build the database of materials we should be looking for in the finished printed materials

Summary

- Test for odor and migration as required.
- Ensure functional barrier when necessary.
- Use appropriate low odor low migration products.
- Ensure test is reflective of standards set by brand owners and regulatory bodies.
- Monitor supply chain.

Brand owners responsibility to ensure product is compliant.

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