

Printing Inks and the Migration Aspect -

When it comes to printing onto food contact materials or cosmetic packaging

Screen/Pad

2019

20. Mar

Materials that come in contact with sensitive contents must fulfil strict legal requirements to guarantee the safety of foods or cosmetics and, in turn, consumers' health and wellbeing. This includes provisions governing the transfer of substances from the FCM into the food or cosmetic product. This transfer of substances (migration) is only permitted in quantities that do not endanger human health, change the food's composition or negatively impact the food's organoleptic characteristics (like taste or smell).

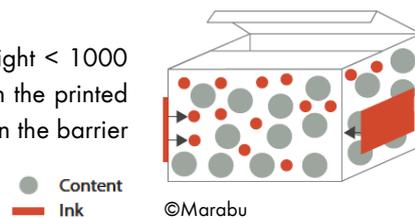
The risk of substances migrating from the printed to the unprinted side of a so-called „contact material“ into the content like foodstuff or cosmetics must be considered before the conformity of a material can be estimated.

There are different types of migration:

Diffusion Migration

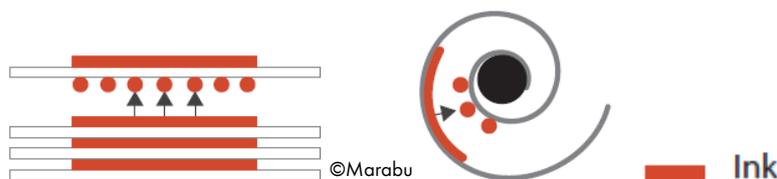
Migration of printing ink ingredients through the substrate

Due to their chemical characteristics and molecular size (molecular weight < 1000 daltons), some substances, known as migrants, are able to migrate from the printed side through the substrate onto the unprinted side. This highly depends on the barrier properties of the substrate.



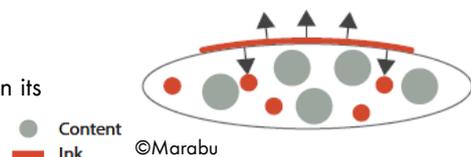
Set-off Migration

Migration of substances from the printed side to the unprinted side of another sheet in a stack, roll or stacked container.



Gas Phase Migration

Migration due to the evaporation of volatile materials by heating food in its original packaging or by steam distillation during cooking, baking or sterilisation.



Migration mainly depends on three parameters:

- **Substrates**

For the migration of substances, the barrier function of the substrate is a substantial property. The greater the barrier properties, the lower the risk of migration ("functional barrier"). Materials/substrates which are completely impermeable for substances, like glass or some metals (for example aluminium foil of at least 7 µm) are so called "absolute barriers". A migration of substances through these materials/substrates („diffusion migration") is simply not possible.

- **Printing Ink**

Migration is an issue for all kinds of printing inks. The selective use of high molecular weight substances (e. g. as higher-functional monomers in UV inks), specific selection and purity criteria of the raw materials, as well as tailored production conditions in order to avoid process-related impurities can significantly reduce the amount of migrating substances compared to conventional (not specifically for this application developed) inks.

- **Process Conditions**

Effective drying and curing of the ink film is the prerequisite to minimize the existence of potential migratable substances, like solvents and monomers. Set-off, where possible, must be avoided throughout the entire printing process. The thickness of the ink film and the ratio of printed to non-printed surface area determine the total amount of the potentially migratable substances from the ink. The more printing ink is used, the greater the quantity of substances that can potentially migrate.

Summary:

Even if the printing ink was designed for this purpose, a migration test with the finished product is always essential because other factors in the process chain such as printing parameters, processing conditions and the choice of packaging components also affect the migration risk. Compliance must therefore always be checked with the printed material.

Contact

In the event of any queries, please contact:

Technical Hotline, Phone: +49 7141 691140, technical.hotline@marabu.de