

Legally compliant varnishing

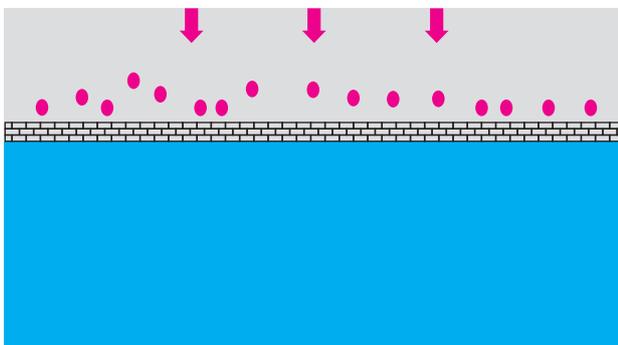
UV based coatings in food packaging printing

Packaging in the direct or indirect food contact must not transfer any constituents to food in quantities, which could a) endanger human health, b) unacceptably change the food composition or c) bring about deterioration in the organoleptic characteristics thereof.

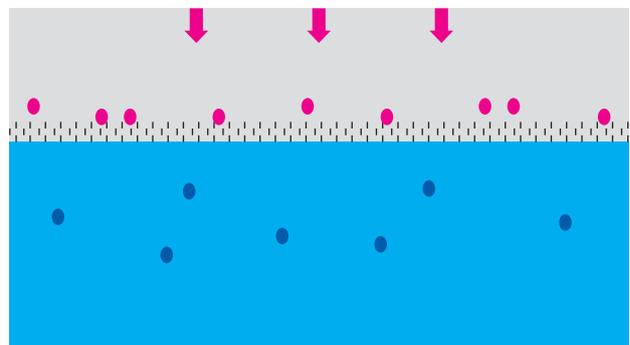
In this context, we see the appropriate selection of all raw materials, as they must comply with relevant specifications and applicable regulations. In contrast to dedicated water-based coatings, UV coatings can be used for the **indirect food contact only**.

The safest way to apply UV coatings on food packaging is to provide a barrier. In this case, the folded box acts as a secondary packaging. However, if there is no barrier available, only suitable UV coatings may be used which comply with applicable food packaging regulations.

In general, we distinguish between absolute and functional barriers. Impermeable materials, such as metal (e.g. aluminum) or glass, represent an absolute barrier towards mass transfer. A functional barrier makes the ready food packaging compliant to legal requirements. These are packaging structures in order to prevent migration of some of the potentially migrating substances into the filling good.



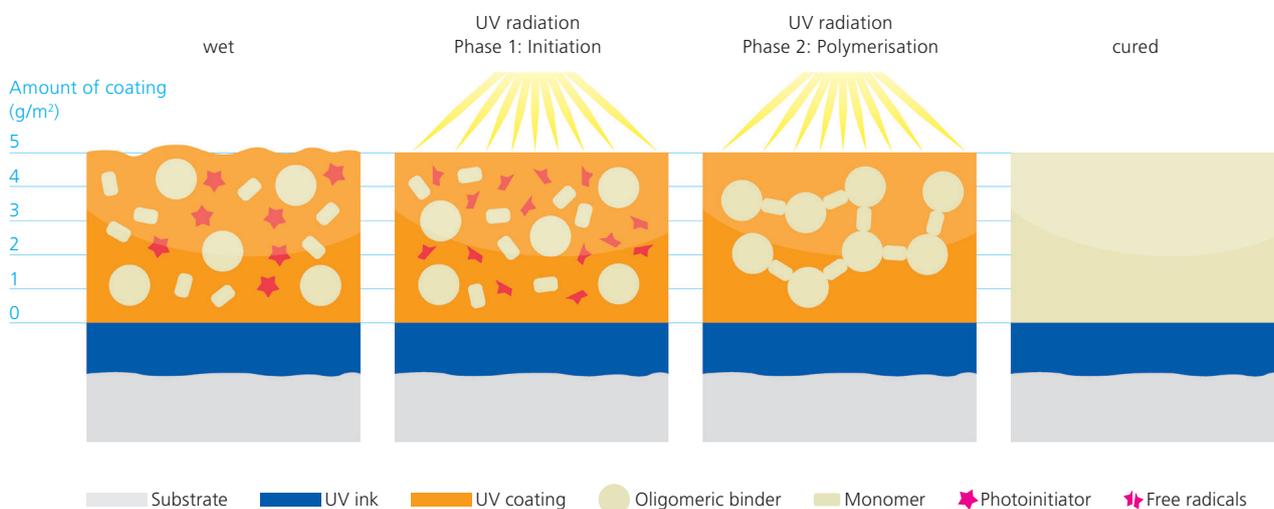
Absolute barrier



Functional barrier

The role of photoinitiators in food packaging printing

Photoinitiators represent a vital part of UV coatings. UV coatings cure under ultraviolet radiation by means of a chemical reaction (chain polymerization). During the radiation with UV energy, photoinitiators become highly reactive particles. They crosslink the acrylates so that a plastic film is formed within milliseconds. Two of the most well-known photoinitiators are 4-methyl benzophenone and benzophenone.



Curing of UV coatings

Photoinitiators are categorized by type (radical, cationic) or molar mass (low molecular, polymeric). Compared to low molecular substances as 4-methyl benzophenone, high molecular photoinitiators provide a lower migration potential in the cured coating film.

However, photoinitiators should not just be evaluated according to their molecular size. Rather it applies to consider the

functionality of the used raw materials. Thus, raw materials should be applied that can be well integrated into the coating, which means they are low migration and suitable for food packaging printing. An example are photopolymerizable binding agents with incorporated photoinitiators.

This approach should be performed for all coating components, as binders, monomers and additives.

Important regulations and directives

For the application of UV coatings in food packaging printing, the following regulations and directives have to be considered. The analysis, if an overall packaging is suitable for the designated filling good, rests upon the responsibility of those who bring the packaging into circulation.

Framework Regulation EU No. 1935/2004:

It refers to those materials and substances that are allowed to come into contact with foodstuffs. Authorized raw materials must fulfil defined purity criteria. Conformity has to be ensured with migration limits. The traceability of materials must be guaranteed at all levels of the supply chain. These principles are also anchored in German law with the LFGB (Lebensmittel-, Bedarfsgegenstände- und Futtermittelgesetzbuch).

Plastic Directive EU No. 10/2011 (PIM):

This directive represents an individual measure in the sense of Framework Regulation EU No. 1935/2004. Although it does not include direct specifications for the evaluation of coatings, it provides the basic rules for plastic materials in food contact (e.g. concept of functional barrier). Also, it specifies the global migration limit of 60 mg/kg (EU cube model) as well as specific migration limits (SML).

Good Manufacturing Practice (GMP):

For the production of food packaging, the Good Manufacturing Practice Regulation (EC) No. 2023/2006 claims compliance with a good manufacturing practice (GMP). It describes requirements made on product manufacturing as well as quality management (production, product safety).

Swiss Ordinance (SR 817.023.21):

The Swiss Ordinance (SR 817.023.21) is valid for all food packaging produced in Switzerland, but also for those food packaging imported from outside the country. In this ordinance, there is a two-part positive list with substances that can be used for the printing of food packaging. By nominating the Nestlé Guidance Note on Packaging Inks as a basic requirement, the Swiss Ordinance also shows relevance over national borders.

Regulation (EG) No. 1895/2005:

Epoxy resins are used in UV inks and coatings. By-products are produced during their manufacturing (e.g. bisphenol A) from which unbound residues can migrate into the foodstuff. This regulation provides specific migration limits for epoxy derivatives.

EuPIA GMP / Suitability List of Photoinitiators 1A oder 1B:

By means of the EuPIA GMP, the European Printing Ink Association wants to avoid any risk that may occur during the development and production of inks and coatings meant for the application on food contact materials. This includes both direct and indirect food contact. The „Suitability List of Photoinitiators 1A or 1B“ classifies photoinitiators. Group 1A refers to photoinitiators that provide a low migration potential as well as toxicological data. Group 1B shows photoinitiators with a low migration potential and/or a high molecular weight.

Overall Planning of Compliant Food Packaging

- What is packed?
- Is there a barrier between filling good and packaging?
- What coating technology is used (AQ vs. UV)?
- Are all other materials suitable for my packaging (e.g. substrate, printing inks)?
- Do I fulfil all legal requirements?
- Is there an appropriate manufacturing process in place?
- Are proper quality assurance measures defined?

Excursus

FoodClass® - certified UV coatings for the indirect food contact

ACTEGA Terra FoodClass is the product line for certified UV coatings in the area of food packaging. These are all UV coatings that can be used in the indirect contact to dry and fatty foodstuffs without the application of a functional or absolute barrier. FoodClass fulfils the following quality attributes:

Regulatory Requirements

- | | |
|---------------------------------|---|
| FoodClass coatings comply with: | <ul style="list-style-type: none"> · Framework Regulation EU No. 1935/2004 · Plastic Directive EU No. 10/2011 (PIM) · Regulation (EG) No. 1895/2005 · Swiss Ordinance (SR 817.023.21) · Nestlé "Guidance Note on Packaging Inks" (exception: oven/microwave) · Good Manufacturing Practice (EC) No. 2023/2006 · EuPIA GMP / Suitability List of Photoinitiators 1A oder 1B |
|---------------------------------|---|



Product-related Requirements

- | | |
|-----------------------------|--|
| FoodClass coatings provide: | <ul style="list-style-type: none"> · Use of selected raw materials · Exclusively higher (>2) acrylated monomers and binders · External certifications by accredited testing laboratories |
|-----------------------------|--|

Production-related Requirements

- | | |
|---------------------------|--|
| FoodClass coatings offer: | <ul style="list-style-type: none"> · Individual production line · Conformity with EuPIA GMP · Compliant packaging of coatings |
|---------------------------|--|

Your contact:

ACTEGA Terra GmbH
 Industriestraße 12
 31275 Lehrte
 Germany

www.actega.com

Disclaimer

All information provided in this publication are made to the best of our knowledge and are advisory. No legal claims can be made out of these statements. Changes due to technical progress, applicable law or production-related needs may be necessary. The content does not claim to be complete.