



Customer Information

UV Labels and UV Sheetfed Inks and Varnishes for Food Packaging

By default, when printing any type of labels or substrates for any food packaging¹, consideration of Migration Optimized UV Inks and Varnishes is a must.

In line with the GMP Regulation (EC) No 2023/2006, the printer and/or packer/filler have to safeguard in any case that there is no migration of concern from the ready-made packaging.

The following table gives **non-exhaustive** guidance on the major packaging categories with risk of migration, set-off and organoleptic changes, for which, **by default, only Migration Optimized UV inks and varnishes** must be used.

Why:

By default, standard UV curing inks and varnishes from the ink industry do contain photoinitiators, acrylate monomers and other substances with high migration potential. As an example, these standard UV inks and varnishes used by the ink industry may contain several low molecular weight photoinitiators such as 2,2-dimethoxy-2-phenylacetophenone (also called benzil dimethyl ketal BDK), 1-hydroxycyclohexyl phenyl ketone (HCPK) and the like, all of them having a high potential for migration.

Standard UV inks are formulated this way for good reasons, like technical performance and cost efficiency, and because food packaging is not the intended application.

Conversely, Siegwerk Migration Optimized UV inks are formulated only with higher molecular weight and thus low migration photoinitiators and acrylates.

¹ As a rule, pharmaceutical companies require packaging suppliers to align with food contact material regulations, consequently, this Customer Information covers as well packaging for pharmaceuticals administered via the oral route.



| Exemplary listing of food packaging applications with risk of migration | | | |
|---|--|---|--|
| Application | Example | Migration risk | About UV inks for this application |
| Self-Adhesive Labels, Cups, Tags, Sleeves, Tubes, Flexible Packaging | | | |
| In-Mould Labels (IML) for cups, tubs, trays | Margarine, ice cream | Yes , direct migration possible and set off. Label will be melted on the container and become a primary food packaging | Only migration optimized products to be used |
| Shrink sleeves on PE / PP / OPS bottles | Dairy food, fruit drinks... | Yes , migration via PE /OPS / PP is possible | Only migration optimized products to be used |
| Shrink sleeves on PET bottles | Soda, mineral water | Minor . Studies show that in many cases PET will be a barrier to migration from inks, however individual case to be assessed. | Migration optimized products highly recommended. If standard products used, consider formal qualification via migration testing. Sensorial issues to be considered. |
| Sleeves or Pressure-sensitive Adhesive (PSA) labels, laminated or not laminated, for cups, tubs, trays | Dairy products, sauces | Yes , migration via diffusion and set off. Sleeve or label will be applied onto the container, become a primary food packaging which is stacked before filling | Only migration optimized products to be used |
| PSA-Labels for Packaging and Lidding | Labels applied on filling line to pre-formed and filled flexible or rigid packaging of all types of food or pharmaceuticals, i.e.: labels on dairy products, sauces in flexible packaging; labels on plastic lidding for ready meals or sauces; labels on PE/PP/OPS bottles for sauces or for pharmaceuticals i.e. eye drops | Yes , Set-off not possible, but still migration via diffusion is possible, depending on barrier properties to migration of the packaging | Only migration optimized products to be used |



| Application | Example | Migration risk | About UV inks for this application |
|--|--|---|---|
| Tubes, cups | Mayonnaise, mustard, dairy products.. | Yes , depending on point in time of tube formation and on presence of barrier to migration: direct migration and/or set off | Only migration optimized products to be used |
| Surface print on monofilm or laminates WITHOUT the inner layer(s) being a barrier to migration | Tea bags, confectionery, bakery products, butter wrappers | Yes , migration both via diffusion across the layers and via set-off | Only migration optimized products to be used |
| Surface print on monofilm or laminates WITH the inner layer(s) being a barrier to migration | Aluminum butter wrappers, soup pouches with alu foil layer | Yes , migration via set off still possible | migration optimized products to be used |
| Direct food contact | <p>Insert labels to be put inside chocolate wrappers with print towards the food; labels onto non-packed sausages like salami; fruit labels for fruits with thin skin and which are not peeled before eating².</p> <p>Labels laid onto bread or on cheese, which are cut before consumption together with the cheese.</p> | <p>Yes, migration is quick and most complete if ink layer is in direct contact; this happens also i.e. with labels on salamis or fruits, touching other pieces with the printed surface.</p> <p>If the label is cut together with the food to pieces, the printed surface of torn pieces comes into contact with the food.</p> | NO UV inks to be used for this application |

² See footnote 4 for vegetables and fruits which are peeled.



| Application | Example | Migration risk | About UV inks for this application |
|--|---|---|--|
| Board or other Rigid Packaging, Paper Packaging | | | |
| Rigid packaging WITHOUT the inner wrap being a barrier to migration | Folding Carton with dry food (cereals) in PE, PP or paper bag, or metalized plastic bag, or food wrapped only in aluminum (not sealed tightly) inside the box, with air room between the two packages | Yes , migration via diffusion and gas phase, or via set-off, diffusion and gas phase | Only migration optimized products to be used (unless formal migration testing and qualification of the final combination of food, inner wrap and rigid packaging proves no migration of concern) |
| Rigid packaging, trays, tags | Board box/tray for chocolates, cookies, cakes, dry pasta, crackers, rice; fast food cases (burger, fries), tea tags, .. <i>Some use for ready meals for microwave and baking oven</i> | Yes , migration via diffusion and gas phase, or via set-off, diffusion and gas phase <i>Migration can be enhanced by temperature and water/steam distillation</i> | Only migration optimized products to be used By default, no use of UV for thermally treated food (microwave, baking oven) |
| Rigid packaging WITH the substrate being a barrier to migration | Sheet or web printed metal box, metal can, ... | Minor , but migration via set off still possible | Migration optimized products highly recommended. If standard products used, consider formal qualification via migration testing. Sensorial issues to be considered. |
| Small Packaging to be filled with Food for Infants and Young Children | | | |
| All small packaging (flexible and rigid) with < 500 milliliters or grams of food | Small sachets or small boxes for baby milk/baby milk powder, tea, cereals, for infants (< 12 months) and young children (< 3 years) | Yes , migration via diffusion, and/or gas phase, and/or via set-off; additionally, the ratio of the surface to the volume of the food is high, thus migrants released by this relatively big surface do end up in a small food volume - this results in comparatively high concentration of migrants in the food. This is tolerated by regulations in case of small packaging with adult food, but NOT for babies and young children. | By default, NO UV for this application |

Important:



As subsequent steps after the selection of proper migration optimized ink and/or varnish – in line with legal responsibilities - both printer and/or packer/filler have to verify the compliance of the finished printed article on the final packaging³.

Why is this additional verification necessary?

Siegwerk Migration Optimized UV inks are formulated considering typical food packaging applications which are representative for the major uses on the market. However, printer’s material combinations and process parameters may be different. Thus validation of the actual end product is due.

Data on migration should be obtained by a **practical migration test**, done by the converter and the packer/filler, of the individual printed packaging material and article in its finished state, taking into account normal and foreseeable conditions of use.

To identify the potential migrants, Siegwirk is prepared to disclose information in a Statement of composition (SOC) respectively a disclosure. To this end, where not yet existing, Siegwirk is prepared to sign a confidentiality agreement.

In preparation of a practical migration test and in cooperation with Siegwirk, the printer shall select the facility with the required analytical capability and regulatory expertise. The migration testing lab must be able to reliably measure potential migrants from packaging printed with Siegwirk products.

As an exception, standard UV inks and varnishes may be used.

If the printer can exclude set-off and taint and has proof that an efficient functional barrier towards migration is existing, also standard UV inks and varnishes may be used. The following table provides an exemplary listing.

Note: **All Siegwirk UV inks and varnishes which are not explicitly named as “Migration Optimized” are by default standard products not optimized for “low-migration” potential.** For specialties and individual cases, and in case of doubt, please ask your Siegwirk contact person.

³ Frequently Asked Questions on the legal status of printing inks, coatings and varnishes for the non-food contact surface of food packaging, EuPIA (www.eupia.org).



| Exemplary listing of food packaging applications that may not involve a migration risk | | | |
|--|--|---|--|
| Application | Example | Migration risk | About UV inks for this application |
| Self-Adhesive Labels, Cups, Tags, Sleeves, Tubes | | | |
| Shrink sleeves on glass bottles | Soda, Mineral water | Glass: No. Glass is by default a recognized barrier to migration. | Standard cationic inks and free radical inks possible. Odour optimized products necessary. |
| PSA-Labels for Primary Packaging and Lidding WITH the inner wrap or lidding being a barrier to migration | Labels applied on filling line to pre-formed and filled packaging/lidding with aluminum foil layer, i.e. labeled ready meal packs or aluminum tubs | No. Aluminium foil prevents diffusion migration, set-off is not possible ⁴ . Sensorial issues to be considered. | Standard cationic inks and free radical inks possible |
| Board Packaging | | | |
| Rigid Packaging WITH the inner wrap being a barrier to migration | Ink on a cereals board box (cereal in laminate OPP/ Alu foil /PE bag inside the box) | No (if alu foil is present, the migrant transfer resulting from a gas phase diffusion can be excluded). | Standard inks possible. Both cationic inks and free radical inks possible. Odour optimised products necessary. |

Important:

⁴ Migration does also not occur when small labels or sleeves are applied to non-packed vegetables, fruits or equivalent food-stuffs with thick skin, where removal of the skin by the consumer before eating is common practice (such as bananas, oranges, melons...), thus risk of migration to the edible part of the food is eliminated.



If the transfer into food cannot be definitively excluded, then a verification of compliance of the finished printed article is necessary, in line with legal responsibilities, by the printer and/or packer/filler on the final packaging.

NOTE: Data on the barrier's properties **regarding migration** should be obtained via a practical migration test performed on the individual end product in its finished state, done by the converter and the packer/filler, taking into account normal and foreseeable conditions of use.

As stated previously, Siegwerk is prepared to disclose the necessary information.

Disclaimer: This customer information replaces all previous statements and recommendations on the use of UV labels and sheet-fed ink and varnishes for food packaging applications. Customers are requested to re-assess current print jobs with respect to the information as outlined in this customer information.

The information in this document reflects Siegwerk's policy and commitments. This statement is valid without signature.