



## NewV UV- inks and varnishes for food packaging

Low-migration, organoleptically  
neutral offset inks

EU Regulation 1935/2004 requires that food packaging must not transfer any components onto the packed foodstuff in quantities that could endanger human health, alter its composition or bring about a deterioration in the organoleptic properties of the foodstuff.

Consequently, no substances are allowed to transfer from substrates, printing-ink and coating films to the packaged food in quantities that exceed the legal limits.

Undesirable interactions between foodstuffs and their packaging can occur by means of

- invisible setoff in the stack or on the reel, that is, the transfer of invisible substances from the printed image to the unprinted reverse side above it (food contact side) and in the end from there to the packaged foodstuff
- migration, that is, the transfer of substances from the printed image through the substrate to the unprinted reverse side and from there to the foodstuff
- the transfer of volatile substances in the enclosed air space of packaging, resulting in negative effects on the odour and taste of the package contents.

UV inks dry in the press by means of a chemical reaction that takes place during radiation in the UV curing unit. During this reaction the UV-reactive, low-molecular photoinitiator and vehicle molecules are cross-linked to build a polymeric, solid film.

When conventional UV inks and varnishes cure, however, there is a certain residual potential for migration due to

- decomposition products of photoinitiators and non-reacted photoinitiators
- residual monomers that remain in the ink film or are absorbed into the substrate
- incomplete reaction by the ink components due to inadequate curing.

According to the EuPIA (European Printing Ink Association) Guideline<sup>1</sup>, the migration of substances for which only inadequate toxicological data is available must not exceed 10 ppb or 10 µg/kg in the foodstuff. For most substances, this value is near the analytical detection limit.

The majority of raw materials used in UV inks and varnishes have not been evaluated for food contact. Standard UV inks are therefore unsuitable for printing food packaging.

<sup>1</sup> Printing inks applied to the non-food contact surface of food packaging materials and articles.

## Colours available

With this ink series, we have been able, through careful formulation with special photoinitiators, vehicles and monomers, to reduce the migration of constituents from the ink or varnish layer following adequate UV-curing to a level close to the analytical detection limit.

| Fastness properties per DIN ISO 12040/2836 |            |          |         |                 |        |
|--|------------|----------|---------|-----------------|--------|
|  |            | Light WS | Alcohol | Solvent mixture | Alkali |
| Yellow                                     | 41 VP 5045 | 5        | +       | +               | +      |
| Magenta                                    | 42 VP 5045 | 5        | +       | +               | -      |
| Cyan                                       | 43 VP 5045 | 8        | +       | +               | +      |
| Black                                      | 49 VP 5045 | 8        | +       | +               | +      |

Naturally, in addition to the process colours, any shade you would like can be formulated on this basis.

## Properties

- Cured ink film has very low migration (test results are available from an independent institute)
- Suitable for use on paper and board
- Conditionally suitable for pretreated PE, PP or primed material<sup>2</sup>
- Organoleptic assessment of printed products shows excellent results („Robinson tests“ EN 1230 T1 and T2).

## Organoleptic characteristics

The UV curing (drying) process often leads to the emission of odour-creating substances that have a negative effect on the organoleptic characteristics of the printed package. These substances may be decomposition products of photoinitiators and vehicles as well as residual monomers that have not been completely cured.

Standard UV inks, which are not optimised in this regard, demonstrate unfavourably high odour and taint values in the Robinson test. The organoleptic characteristics, however, also depend on the curing conditions and equipment (output of the UV curing unit).

You must also taken into account the fact that many substrates exhibit a distinct increase in odour after passing through the UV curing unit. This increase in odour on the part of the substrates can frequently be even greater than the odour generated during curing of the UV inks and varnishes.

## Technical application

The migration-optimised UV inks have very good, trouble-free printing characteristics.

- Wide range of fount solution tolerance
- High colour intensity
- Rapid adjustment of a stable ink/water balance
- Minimal misting

## Application instructions

Detailed instructions on the use of UV-curing inks and varnishes can be found in our Technical Information sheet 5.01.01 entitled „NewV UV-curing inks and varnishes – Directions for use“.

<sup>2</sup> Non-absorbent substrates must have a surface tension of at least 38 mN/m in order to ensure optimum ink adhesion. In view of the large number of substrate suppliers and different substrates and substrate grades available, we recommend you carry out an adhesion test prior to beginning the print run.

## Curing

The good migration results are only achieved if the ink film has been properly cured. Inadequate curing always leads to increased migration of ink or varnish constituents.

A variety of factors influence the degree of curing:

- the type and energy output of the UV lamps
- the press speed
- the substrate (its absorbency)

This means it is essential to continuously monitor the quality of curing and the output of the dryers.

## Dampening / Fount solution composition

Special low-migration fount concentrates have been developed to satisfy the requirements of food packaging.

**MGA-COMBIFIX® 8060** (for printing with IPA)

**MGA-SUBSTIFIX® 8360** (for printing without IPA)

It is best to keep the dampener setting low, particularly when ink coverage is low. The isopropanol concentration in the fount solution when using MGA-COMBIFIX® must not exceed 10% with a pH of 5.0 – 5.3.

## Printing auxiliaries

The inks are always supplied ready to use. The following auxiliaries are available to help you adjust the process inks in exceptional cases:

- **NewV sup Low-migration Paste Reducer 40 VP 1020 (reduces tack)**

Under no circumstances may auxiliaries – in particular activator pastes or photoinitiator pastes – from conventional UV ink series be used, because a very large number of them contain substances capable of migrating.

## Roller treatment / Washup

When switching from printing with conventional UV inks to low-migration inks, the inking and coating units (including the piping) must be cleaned thoroughly. After washing the rollers, leave them to dry well.

## Finishing instructions

We recommend application of a coating in order to provide effective protection of the print image. Our product range offers suitable low-migration UV-curing varnishes or low-migration water-based emulsion coatings for this purpose.

### UV varnishes

- Gloss varnish, UV-curing

**40 VP 0033**

### Water-based emulsion coatings

- Glossy and rub-resistant coating for single-sided coating
- Wet-blocking-resistant and rub-resistant coating

**MGA-ACRYLAC® 580130/40**

**MGA-ACRYLAC® 580162/40**

If required, other coatings with additional special properties can also be supplied.

## Special instructions

These products are experimental products. Modifications may be made to the formulation of the inks/varnishes in the course of ongoing development.

These products are formulated and produced in compliance with the „*EuPIA Guideline on Printing Inks applied to the Non-Food Contact Surface of Food Packaging Materials and Articles*“ published by the European Printing Ink Association (EuPIA). Excluded are the migration-capable substances used as vehicles (monomers), which only fulfil the requirements of the Guideline when fully cured. Once the varnish film has been properly cured, no more substances can migrate to the foodstuff in quantities that exceed the legal limits. This has been verified in investigations conducted in the **hubergroup's** laboratories.

Despite this, we cannot guarantee the lowness of the level of migration of the cured ink film even if the degree to which the ink has been cured is sufficient. This is due to the experimental nature of the products and the fact that we have not yet received confirmation that all of the raw materials used actually comply with the higher requirements in this regard. Moreover, the products are not yet being produced in a plant specifically designated for this purpose, nor in accordance with good manufacturing practice (GMP). These points are the subject matter of the development work currently in progress.

The low-migration monomers currently being used as vehicles in these products have not yet been evaluated in their non-cured form with respect to food contact. If they are not adequately cured, there is a possibility of traces remaining in the ink or varnish film. In this case, it is not possible to completely rule out migration of these substances from the ink/varnish film through the substrate or invisible setoff from the printed outer side to the food contact side in the stack or on the reel. Paper, board and cardboard do not act as adequate barriers to migration-capable constituents of UV-curing printing inks and varnishes. The user is responsible for ensuring that curing of the products is complete.

Responsibility for verifying the conformity of the finished product lies with the manufacturer of the packaging and the packer. Upon request, we will provide a test laboratory commissioned to carry out migration tests with all the information about the constituent components of the UV inks and varnishes required to perform such tests.

## Classification

Safety Data Sheet available on request.

## Shelf life

When stored under the correct conditions (20°C, protected against light and heat):

Inks: min. 12 months

Varnishes: min. 3 months

## How supplied

### Inks:

2,5-kg-cans

### Varnish:

25-kg canisters

200-kg barrels

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Contact addresses for advice and further information can be found under [www.NewV-inks.com](http://www.NewV-inks.com)

This Technical Information sheet reflects the current state of our knowledge. It is designed to inform and advise. We assume no liability for correctness. Modifications may be made in the interest of technical improvement.