

**UV-curable screen printing ink for pre-treated polyethylene and polypropylene**

**Very fast curing, high degree of gloss, water and steam resistant, high filler resistance, thixotropic adjustment**

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## Field of Application

### Substrates

Ultra Pack UVK+ is a UV-curable screen printing ink which is well-suited for printing onto flame-treated polyethylene HDPE /LDPE and polypropylene PP.

Before printing onto PE and PP, please keep in mind that the substrate surface must be pretreated by flaming. With this process, surface tension will rise and a very good adhesion from 44 mN/m is possible. The surface treatment can be tested by appropriate test inks.

Furthermore, the substrate surface must be absolutely free of contaminating residues such as grease, oil, and finger sweat.

Since all the print substrates mentioned may be different in printability even within an individual type, preliminary trials are essential to determine the suitability for the intended use.

### Field of use

Ultra Pack UVK+ was developed especially for direct container and packaging printing. It can be used both on single and multi-colour printing machines at a printing speed of up to 7,000 bottles per hour (for more information, see chapter 'Curing'). UVK+ is, therefore, best suited for high-quality prints onto bottles, cans, cups, and cartridges.

This ink series is not suitable for direct food contact nor for printing on food contact materials as substances contained in the formulation or introduced by contamination may migrate under certain conditions. Materials that constitute a natural migration barrier are excluded. If this ink series is nevertheless used for printing on permeable food contact materials, the manufacturer of the printed product is responsible for ensuring that its products comply with

legal or industry-specific requirements.

For printing on permeable food contact materials (= without appropriate migration barrier), we recommend our specially designed Ultra Pack UVFP / Tampa® Tex TPX.

## Characteristics

In regard of viscosity and rheology, all Ultra Pack UVK+ colour shades are press-ready and brilliant at a best possible opacity and high gloss. All UVK+ shades can be embossed with suitable hot stamping foils.

### Ink Adjustment

The ink should be stirred homogeneously before printing and if necessary during production.

#### Use as 2-component ink

Depending upon the substrate and the requirements, hardener can be added to the ink before printing:

White shades max. addition 2 %, Black & colour shades 2-4 %.

When using hardener, the processing and curing temperature must not be lower than 15 °C as irreversible damage can occur. Please also avoid high humidity for several hours after printing as the hardener is sensitive to humidity.

#### Pre-reaction time

It is recommended to allow the ink/hardener mixture to pre-react for 15 minutes.

#### Pot life

The ink/hardener mixture is chemically reactive and must be processed within 6-8 h (referred to 20-25 °C and 45-60 % RH). Higher temperatures reduce the pot life. If the mentioned times are exceeded, the ink's adhesion and resistance may be reduced even if the ink still seems processable.

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## Drying

Ultra Pack UVK+ is a very fast curing UV ink. A UV-curing unit (medium-pressure mercury lamp) of 120 to 200 W/cm is therefore necessary.

The curing speed of the ink is generally dependant upon the kind of UV-curing unit (reflectors), number, age, and power of the UV-lamps, the printed ink film thickness, colour shade, substrate in use, as well as the printing speed.

Adhesion of the ink is usually controlled by a tape test after the printed bottles have cooled down to room temperature. Ultra Pack UVK+ is a post-curing UV ink which will achieve its best adhesion and resistance after 24 hours.

As with all UV-curable printing inks, the presence of residual monomers and photoinitiators' decomposition products cannot be completely ruled out even after sufficient curing. If these traces are relevant for the application, this must be taken into account in individual cases, as this depends on the actual printing and curing conditions.

## Stress resistance

After proper and thorough drying, the ink film exhibits outstanding adhesion as well as rub, scratch and block resistance and is resistant to solvents (see DIN 16 524), alcohol (96 % ethanol), finger sweat, and further common alkaline and acid fillers. These resistances can be further improved by adding Hardener H 3.

## Range

### Basic Shades

922	Light Yellow
924	Medium Yellow
926	Orange
932	Scarlet Red
934	Carmin Red
936	Magenta
950	Violet
952	Ultramarine Blue
956	Brilliant Blue
960	Blue Green
962	Grass Green

970	White
980	Black

### High Opaque Shades

170	Opaque White
180	Opaque Black

### Further Products

904	Special Binder
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All shades are intermixable. Mixing with other ink types should be avoided in order to maintain the special characteristics of this outstanding ink range.

All basic shades are included in our Marabu-ColorFormulator (MCF). They build the basis for the calculation of individual colour matching formulas, as well as for shades of the common colour reference systems HKS®, PANTONE®, and RAL®. All formulas are stored in the Marabu-ColorManager software.

## Metallics

### Metallic Pastes

S-UV 191	Silver	14-25%
S-UV 192	Rich Pale Gold	14-25%
S-UV 193	Rich Gold	14-25%
S-UV 291	High Gloss Silver	10-25%
S-UV 293	High Gloss Rich Gold	10-25%
S-UV 296	High Gloss Silver	11-17%
S-UV 297	High Gloss Rich Pale Gold	11-17%
S-UV 298	High Gloss Pale Gold	11-17%

These metallics are to be added to UVK+ 904 in the recommended amount, whereas the addition may be individually adjusted to the respective application. We recommend preparing a mixture which can be processed within a maximum of 8 h since metallic mixtures usually cannot be stored.

Owing to the smaller pigment size of Metallic Pastes it is possible to work with finer fabrics like 140-31 to 150-31.

All metallic shades are displayed in the Marabu "Screen Printing Metallics" colour chart.

## Auxiliaries

H 3	Hardener	2-4%
UVV 3	Thinner	1-10%
UV-B 1	UV Accelerator	1-2%
STM	Thickening Agent	0.5-2%
UV-VM	Levelling Agent	0.5-1.5%
UV-SA 1	Surface Additive	0.4-0.8%
UV-TA 1	Thickening Agent	0.1-0.5%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	

Hardener H 3 is sensitive to humidity and is always to be stored in a sealed container. Hardener H 3 can be added for increased resistance and adhesion. The mixture ink/hardener must be stirred well and homogeneously. The mixture ink/hardener is not storable and must be processed within pot life.

The addition of thinner reduces the ink viscosity if necessary. An excessive addition of thinner will cause a reduction of the curing speed, as well as of the printed ink film's surface hardness. The thinner becomes part of the cross-linked matrix when UV-cured and may slightly change the inherent odour of the printed and cured ink film.

UV-B 1 accelerates the curing speed if necessary and may increase the adhesion to the substrate owing to a better depth curing.

The Thickening Agent STM enhances the ink's viscosity without significantly influencing the degree of gloss. Please stir well, the use of an automatic mixing machine is recommended.

The Levelling Agent UV-VM helps to eliminate flow problems which may arise due to residuals on the substrate's surface or incorrect adjustment of the machines. An excessive amount may reduce the ink's adhesion when overprinting. UV-VM must be stirred homogeneously before printing.

The addition of UV-SA 1 can permanently increase the surface smoothness, gloss, and surface hardness.

The liquid Thickening Agent UV-TA 1 increa-

ses the viscosity and improves the dot definition at higher processing temperatures.

The cleaners UR 3 and UR 4 are recommended for manual cleaning of the working equipment. Cleaner UR 5 is recommended for manual or automatic cleaning of the working equipment.

## Printing Parameters

Selection of the fabric depends on the printing conditions, the required curing speed and productivity, as well as the requested opacity. Generally, fabrics of 140-31 to 180-31 can be used. A uniform screen tension (> 16 N) of all fabrics used is further important. All commercially available capillary films (15-20 µm) or solvent resistant photo emulsions and combined stencils can be used for UV-inks.

## Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. It is 2.5 years for an unopened ink container if stored in a dark room at a temperature of 15-25°C. Under different conditions, particularly higher storage temperatures, the shelf life is reduced. In such cases, the warranty given by Marabu expires.

## Note

Our technical advice whether spoken, written, or through test trials corresponds to our current knowledge to inform about our products and their use. This is not meant as an assurance for certain properties of the products nor their suitability for each application.

You are, therefore, obliged to conduct your own tests with our supplied products to confirm their suitability for the desired process or purpose. The foregoing information is based on our experience and should not be used for specification purposes. All characteristics described in this Technical Data Sheet refer exclusively to the standard products listed under "Range", provided that they are processed in accordance with their intended use and only when used

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with the recommended auxiliaries. The selection and testing of the ink for specific applications is exclusively your responsibility. Should, however, any liability claims arise, they shall be limited to the value of the goods delivered by us and utilised by you with respect to any and all damages not caused intentionally or by gross negligence.

## Labelling

For Ultra Pack UVK+ and its auxiliaries, there are current Material Safety Data Sheets available according to EC regulation 1907/2006, informing in detail about all relevant safety data including labelling according to EC regulation 1272/2008 (CLP regulation). Such health and safety data may also be derived from the respective label.

## Safety rules for UV printing inks

UV-inks contain some substances which may irritate the skin. Therefore, we recommend to take utmost care when working with UV-curable printing inks. Parts of the skin soiled with ink are to be cleaned immediately with water and soap. Please read the notes on labels and safety data sheets.