

UV-curable screen printing ink for pre-treated polyethylene and polypropylene, polyester PET and PETG, rigid PVC, polycarbonate, and polystyrene

Very fast curing, high gloss, excellent water resistance, thixotropic adjustment, very universal use

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Field of Application

Substrates

Ultra Pack UVC is a universal screen printing ink which is suited for the following substrates:

- Pre-treated polyethylene HDPE /LDPE and polypropylene PP
- Flame-treated and non-treated PET and PETG
- Polycarbonate PC
- Rigid PVC and self-adhesive PVC films
- Polystyrene PS
- Polyamide PA

The addition of hardener is recommended for polyamide. By adding hardener to the ink, adhesion as well as chemical and water resistance will be enhanced.

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

UVC is best suited for high-quality prints onto bottles, cans, tubes, jugs, and cartridges.

Before printing onto PE and PP, please keep in mind that the non-polar and thus low surface tension of the substrate surface must be treated 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. The substrate surface must be absolutely free of contaminating residues such as grease, oil, and finger sweat. Due to the processing parameters, PET and PETG substrates can have great differences in surface tension which can be rectified by a pre-treatment with a 'soft' gas flame.

The adhesion of Ultra Pack UVC to PVC is very

good, but take into consideration the embrittlement of PVC due to UV-light in the UV-dryer.

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.

Characteristics

All Ultra Pack UVC shades are brilliant and high-gloss at the best possible opacity. Further characteristics:

- fast curing
- good 1-c water and steam resistance
- high filler resistance
- flexible ink film, e. g. for tubes
- thixotropic structure, and no drip-through during machine stops
- can be hot-stamped

If printing onto very hot substrates, the degree of gloss of UVC will generally decrease.

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

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printing.

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.

Drying

Ultra Pack UVC is a very fast curing UV ink for a printing speed of up to 7000 bottles/hour. 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 dependent 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.

Ultra Pack UVC is a post-curing UV ink which will achieve its final adhesion and resistances after 24 hours. The ink film should pass a cross hatch tape test after having cooled down to room temperature.

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.

Please make sure that waste prints are also com-

pletely cured, otherwise they are subject to the same disposal rules as liquid ink residues (hazardous waste).

Fade resistance

Pigments of good to excellent fade resistance (blue wool scale 6-8) are used for the UVC range except for colour shade 934.

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 chemical resistances can be improved by adding hardener.

Range

Basic Shades

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

4-Colour Process Shades Standard

409	Transparent Base
425	Process Yellow
435	Process Magenta
455	Process Cyan
485	Process Black

High Opaque Shades

122	High Opaque Light Yellow
132	High Opaque Scarlet Red
152	High Opaque Ultramarine Blue
162	High Opaque Grass Green
170	Opaque White
171	Opaque White
180	Opaque Black
188	Deep Black

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Etch Imitation Effects

914 Satin Transparent Varnish

Further Products

270 High Gloss White
904 Special Binder
910 Overprint Varnish
UVC-IFT Varnish "Inline Foiling Tubes"

Transparent Base 409 is used to adjust the density without changing rheological properties and is only recommended for 4-Colour Process Shades.

UVC 171 Opaque White („White for tubes“) is a very flexible, high gloss opaque white which withstands extreme mechanical stress. UVC 171 is therefore especially suited for elastic substrates such as tubes made of polyethylene. Used as pre-print white, it provides a perfect base for high quality decorations in combination with the UVC Basic, 4-Clr Process, or High-Opaque Shades.

UVC 270 excels through its very high white level even in mixed colour shades. For its non-yellowing feature it is therefore recommended especially for sensitive white matches.

UVC 188 is especially suited for transparent substrates thanks to its good opacity.

Owing to their higher pigmentation, high-opaque or mixed shades require more UV energy for ink curing resp. a reduction of the printing speed/number of passes.

All shades are intermixable. Mixing with other ink types or auxiliaries must be avoided in order to maintain the special characteristics of this ink.

UVC-IFT serves as a carrier for coloured pigments for cold foil applications in the Inline-foiling process. UVC-IFT can also be used purely as a high-transparent protective varnish for the designs applied in this way.

UVC-IFT is silicone-free. For silicone-free products it is important to use only thoroughly cleaned stencils, squeegees, ink pumps, tubes (in the case of an automatic ink supply), and in-

jectors for the manual ink filling of the stencil, etc. If cleaning is carried out with automatic screen washing systems, we recommend prior to printing an additional manual cleaning with a fresh cleaner not having had any contact with ink residues containing silicone.

All shades are intermixable (except UVC-IFT). Mixing with other ink types or auxiliaries must be avoided in order to maintain the special characteristics of this ink.

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 191	Silver	15-25%
S 192	Rich Pale Gold	15-25%
S 193	Rich Gold	15-25%
S-UV 191	Silver	15-25%
S-UV 192	Rich Pale Gold	15-25%
S-UV 193	Rich Gold	15-25%
S-UV 291	High Gloss Silver	10-25%
S-UV 293	High Gloss Rich Gold	10-25%
S-UV 296	High Gloss Silver	10-17%
S-UV 297	High Gloss Rich Pale Gold	10-17%
S-UV 298	High Gloss Pale Gold	10-17%

These metallics are added to UVC 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. Metallic shades are subject to an increased dry abrasion which can only be reduced by overvarnishing. All metallic shades are displayed in the Marabu "Screen Printing Metallics" colour chart.

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Auxiliaries

H 3	Hardener	2-4%
UVV 1	Thinner	1-10%
UVV 3	Thinner, reactive	1-10%
UV-B 5	UV Accelerator	1-4%
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 is to be stirred well and homogeneously. The mixture ink/hardener is not storable and must be processed within pot life. (White shades max. addition 2%, Black & colour shades 2-4%).

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 5 accelerates the surface curing.
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 sur-

face hardness.

The liquid Thickening Agent UV-TA 1 increases 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 120-31 to 180-31 can be used. For UV inks, all commercially available capillary films (15-20 µm) or solvent resistant photo emulsions and combined stencils can be used.

Shelf Life

The shelf life for an unopened ink container if stored in a dark room at a temperature of 15 - 25 °C is:

- 1 year for UVC-IFT
- 2.5 years for all other UVC standard products

The ambient temperature may fall below this value only once for max. 2-3 days. Under different conditions, particularly other storage temperatures, the shelf life is reduced. In such cases, the warranty given by Marabu expires.

Attention: Owing to the changed formulation, shelf life of UVC 188 is reduced to 1 year starting with batch 231.

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

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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 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* UVC 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.