

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

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

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Field of Application

Substrates

Ultrapack UVC 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 (pot life 6-8 h).

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

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 as well as a sufficient adhesion.

Field of use

UVC has been especially developed for direct container and packaging printing.

UVC can be used both on single and multi-colour printing machines at a printing speed of up to 7000 bottles per hour (for more information, see chapter 'Curing'). UVC is, therefore, best suited for high-quality prints onto bottles, cans, tubes, jugs, and cartridges.

UVC may be used, by an appropriate printing process, to print onto the non food-contact surface of any material or article intended to come into contact with foodstuffs. However, full compliance with the regulation (EC) Nr. 2023/ 2006 must be ensured. We recommend a migration test with the finished product.

In case of any queries please contact our Marabu product safety department directly.

Characteristics

Ink characteristics

All 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
- Opaque White 170 for dark substrates
- can be over-embossed with hot foils

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

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Adjustment of the ink

Ultrapack UVC is press-ready. However, please stir well before printing.

To further improve the chemical resistance, we recommend to use hardener H 3. For more details about this auxiliary, please see chapter 'Additives and Auxiliaries'. By adding hardener H 3 to the ink (attention pot life), adhesion as well as water resistance will be enhanced.

Curing

Ultrapack 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 or fusion) of 120 to 200 W/cm is therefore necessary. The curing speed of the ink is generally depending on the kind of UV-curing unit (reflector), the number, age and power of the UV-lamps, the printed ink film thickness, the colour shade, the substrate in use, as well as the printing speed/number of passes.

Adhesion of the ink is usually controlled by a tape test after the printed bottles have cooled down to room temperature.

Ultrapack UVC is a post-curing UV ink which will achieve its best adhesion and resistances after 24 hours.

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.

Especially these resistances can be improved by adding 2-4% of hardener H 3.

Range

Basic Shades - System Ultracolor

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

High-opaque shades

122	Light Yellow
132	Scarlet Red
152	Ultramarine Blue
162	Grass Green

Four intensively pigmented colour shades especially for dark or transparent substrates allow a cost-saving production by superseding the frequent white pre-print. Additionally the high-opaque shades can be used for general mixed shades in achieving added opacity without the addition of white, therefore maintaining greater brilliance.

Further Color Shades

170	Opaque White
171	Flexible white, especially for tubes
270	High gloss white with excellent whiteness

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.

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- 180 Opaque Black
- 188 Deep black, high opacity (for transparent substrates)

4-colour process shades

- 425 Process Yellow
- 435 Process Red (Magenta)
- 455 Process Blue (Cyan)
- 485 Process Black

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 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-Color Manager software.

The pigments used in the above mentioned standard shades, based on their chemical structure, correspond to the EEC regulations EN 71/part 3, safety of toys - migration of specific elements.

Due to possible direct contact with the mouth, **we do not recommend** to use this ink neither for baby bottles, toys, nor for food packaging in direct touch with food since the possible presence of residual monomers and decomposition products of the photo-initiators cannot be excluded even when sufficiently cured.

Additives

Transparent Base UVC 409

Thixotropic auxiliary for 4-colour process printing, fine details, and reverse printing.

By adding transparent base to the 4-colour process shades, the ink's density will be reduced and can be adjusted according to the print copy.

Special Binder UVC 904

Addition: 10 - 15% parts by weight

Special Binder UVC 904 can be used as bronze binder or as extender for basic shades. An addition of UVC 904 will accelerate the curing speed reducing, however, the opacity at the same time.

Overprint Varnish UVC 910

Highly transparent varnish for top-coating or for spot-varnishing.

Varnish, satin-transparent UVC 914

Transparent satin-finish for special effects.

Bronzes

Various bronze pastes are available which can be mixed with UVC 904. They can be chosen according to the required opacity, cost limit, visual impression, and curing characteristics.

Low-priced, slightly structured Bronze Pastes

6 months pot life, fair opacity

S-UV 191	Silver	4:1 - 7:1
S-UV 192	Rich Pale Gold	4:1 - 7:1
S-UV 193	Rich Gold	4:1 - 7:1

High-gloss fine pigmented Bronzes

24h pot life, excellent opacity

S-UV 296	High-gloss Silver	6:1 - 9:1
S-UV 297	High-gloss Rich Pale Gold	6:1 - 9:1
S-UV 298	High-gloss Pale Gold	6:1 - 9:1

High Opacity 'Metallic' Bronzes

Slightly structured, excellent rub resistance, max. 12h pot life

S-UV 291	High-gloss Silver	4:1 - 10:1
S-UV 293	High-gloss Rich Gold	4:1 - 10:1

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All figures in brackets are guidelines for mixtures with UVC 904 Special Binder while the first figure is standing for the parts by weight of UVC 904.

Auxiliaries

Accelerator UV-B1

Addition: 1–2% parts by weight

Accelerates the curing reaction of the ink and increases the adhesion to the substrate owing to a better depth curing.

Liquid Thickener UV-TA 1

Addition: 0,1-0,5% parts by weight

Increases the viscosity of the ink to help hold fine details and when higher printing temperatures are expected.

Hardener H 3

Addition:

Colour shades + Black: 2-4% parts by weight

White 970 and 170: 2% parts by weight

Water resistance, adhesion, as well as chemical resistances of UVC can be improved by adding hardener H 3.

H 3 is to be stirred well and homogeneously. The mixture UVC and H 3 cannot be stored for a longer time and must therefore be processed within 6-8 hours.

Thinner: UVV 1

Addition: 1–10% parts by weight

UVC is press-ready but, if necessary, the viscosity can be reduced by adding thinner UVV 1. Due to the addition of thinner, the odour of the cured ink film will increase accordingly. We do not recommend to add a higher quantity of thinner since this will cause a reduction of the surface's hardness. UVV1 is part of the cross-linked matrix when UV-cured.

Levelling Agent UV-VM

Addition: 0.5-1.5% parts by weight

Helps to eliminate flow problems (e.g. bubbles, etc.) which may arise due to residuals on the substrate's surface, insufficient screen tension or incorrect adjustment of the machines.

Excessive addition may reduce the ink's adhesion when overprinting. UV-VM is to be stirred well und homogeneously before printing.

Thickening Agent STM

Addition: 0.5-2% parts by weight

Increases the ink's viscosity without influencing the gloss degree significantly. STM is to be stirred well, we recommend to use a motorised stirrer.

Cleaning

For manual cleaning of screen printing stencils and tools our cleaner UR 3 (flash point 42° C) or UR 4 (flash point 52°C) can be used. We generally recommend to clean the tools immediately after printing, especially if cross-linked adhesion modifiers have been used.

Fabrics, stencils

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.

For UV inks, all commercially available capillary films (15-20 µm) or solvent resistant photo emulsions and combined stencils can be used.

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Mileage

As a guide, a 'rule of thumb' is approx. 60-80 m² per kg of ink, which means between 6000-6500 containers, full print, (110 cm²/per bottle) or around 25000 prints with text (25% coverage at 27,5 cm²/per bottle).

Shelf life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. It is 2 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.

Labelling

For our ink type Ultrapack UVC and its additives and 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 the present EEC regulations as to health and safety labelling requirements. Such health and safety data may also be derived from the respective label.

Safety rules for UV screen printing inks

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

Note

Our technical advice whether spoken, written, or through test trials corresponds to our current know-ledge 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 selection and testing of the ink for specific application 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.