

UV screen printing ink for various substrates like rigid PVC, polystyrene, pretreated polyethylene (PE) and polypropylene (PP), coated substrates, metals, and glass

High gloss, fast curing, good opacity, very high resistance to chemicals, versatile application

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Field of Application

Substrates

Ultraplus UVP is a universal UV screen printing ink with very high resistances to chemicals, suitable e. g. for the following substrates:

- Pretreated PE and PP
- powder and wet-coated substrates
- Metals
- Glass (decorative indoor use without influence of humidity)
- Rigid PVC, polystyrene
- ABS/SAN
- PETG/PETA
- PC
- Self-adhesive PVC film
- PMMA

Before printing on PET and PP, please keep in mind that the non-polar and thus low surface tension of the substrate surface must be treated by flaming in the usual way. By this process, the surface tension will rise and from 48 – 54 mN/m, a very good adhesion is possible.

The surface treatment can be tested by appropriate test inks or a water test where a wetted bottle must hold the closed water film for about 20 sec. Furthermore, the substrate surface must be absolutely free of disturbing residues such as grease, oil, and finger sweat.

With the adequate additives and auxiliaries, UVP adheres to some metals, such as e. g. brushed aluminium or strip steel and very decoratively on glass, as well. How to use the adhesion modifiers, please see chapters "Additives

and Auxiliaries" where they are described in detail.

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

Field of use

The high-glossy Ultraplus UVP is used for container printing, as well as graphical and industrial screen printing where most critical substrates (for UV inks) are used or if highest resistances to chemicals are demanded. In this case, UVP may also be used on self-adhesive foils.

Adhesion of Ultraplus UVP is very good on PVC, however, please mind the material embrittlement of PVC in general (we always recommend preliminary trials!).

On die-cast parts of polystyrene, e.g. lipstick cases, you can achieve good adhesion, as well.

Characteristics

Ink characteristics

All Ultraplus UVP colour shades are brilliant at high gloss and best possible opacity. Ultraplus UVP has a hard cross-linking and will therefore be brittle in case of highest chemical and mechanical resistances.

Due to this, UVP is hardly formable and cannot be moulded. If you want to cut and punch in the printed ink film, preliminary trials are essential.

Adjustment of the ink

Ultraplus UVP is press-ready. However, please stir well before printing. Due to the various substrates and different printing machines,

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printing speeds and UV drying units existing in the market, UVP can be modified with various additives in its reactivity, viscosity, and adhesion characteristics.

Curing

Ultraplus UVP is a fast curing UV ink. A UV curing unit with two medium pressure Mercury Vapour Lamps (capacity 80 - 120 W/cm) or one lamp (capacity 150 - 180 W/cm) is curing UVP at a belt speed of 10 - 20 m/min or 4800 passes/h. Opaque White UVP 170 and Opaque Black UVP 180 are drying more slowly (approx. 15 m/min) due to their high amount of pigments.

Generally, the hardening speed of the ink depends on the type of UV dryer (reflectors), the number, age and capacity of the UV tubes, the printed coat thickness, the colour shade, the used substrate and the belt speed (number of passes) of the UV dryer.

Ultraplus UVP is a slightly post-curing UV ink. The ink should pass a cross hatch tape test after exiting the curing unit and cooled to room temperature. After 24 hours, the printed ink film achieves its maximum resistance to fillers and water as well as rub resistance.

Fade resistance

Pigments of medium to good fade resistance are used for all Ultraplus UVP shades. Therefore, the prints are suitable for indoor and limited outdoor use up to one year in moderate Central European climate.

For shades mixed by adding a high percentage (>20 %) of white or varnish, we recommend an overcoat with our Special Binder UVP 904.

Stress resistance

After proper and thorough drying, the ink film exhibits outstanding adhesion as well as rub, scratch, and block resistance and is highly resistant to solvents (see DIN 16 524), alcohol (Ethanol 99.8 %), finger sweat, battery acid, and other usual fillers. The resistance to water can be increased by adding Adhesion Modifier

UV-HV 4 or UV-HV 7 (according to the kind of drying).

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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 | | |

Further shades

| | | | |
|-----|--------------|-----|--------------|
| 170 | Opaque White | 180 | Opaque Black |
|-----|--------------|-----|--------------|

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.

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.

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.

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When printing onto exterior packaging for food or similar goods, we recommend carrying out a migration test with the final product.

Additives

Special Binder UVP 904

Addition: 1 - 25% parts of weight

Special Binder UVP 904 is used as a bronze binder or mixing varnish to colour shades. The addition of UVP 904 accelerates the hardening speed and reduces at the same time the opacity and outdoor resistance.

Bronzes

Various bronze pastes are available which can be mixed with UVP 904. They can be chosen according to the required opacity, cost limit, visual impression, and curing characteristics. Due to the bigger pigment size of bronze pigments, we recommend a coarser fabric, e. g. 100-40.

Bronze Powder

| | | |
|-------|--------------------------|-----|
| S 181 | Aluminium | 6:1 |
| S 182 | Rich Pale Gold | 5:1 |
| S 183 | Rich Gold | 5:1 |
| S 184 | Pale Gold | 5:1 |
| S 186 | Copper | 4:1 |
| S 190 | Aluminium, rub-resistant | 6:1 |

Bronze mixtures cannot be put into storage for later use. Therefore, prepare fresh mixes daily (to be processed within 8 h).

Low-priced, slightly structured Bronze Pastes

Pot life 6 months, reduced 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, metallic Bronzes

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

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

Due to the smaller pigment size compared to the bronze powders, it is possible to work with finer fabrics of 140-31 to 150-31.

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

Adhesion Modifier UV-HV 1

Addition: 0.5 - 2 % parts by weight

UV-HV 1 may be added to the UVP to rectify adhesion problems. It is important to mix the additive carefully and homogeneously into the ink. It improves adhesion on coated papers, cartons (e. g. Chromolux), and metals. UV-HV 1 is **not** suitable for printing onto plastic.

Mixtures of Ultraplus UVP and UV-HV 1 cannot be put into storage for later use. Prepare fresh mixes daily (to be processed within 8 h).

Adhesion Modifier UV-HV 4

Addition: 0.5 - 4 % parts by weight
White 970 and 170: 2 % parts by weight

UV-HV 4 improves the adhesion of the UVP on metals and glass as well as generally on highly cross-linked substrates or when overprinting overcured ink shades. The best

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possible adhesion and scratch resistance will be achieved after 12 - 24 h (preliminary trials are necessary!).

UV-HV 4 must be stirred well into the ink. Mixtures cannot be put into storage for later use. Prepare fresh mixes (to be processed within 2-4 h).

Adhesion Modifier UV-HV 7

Colour shades, Black: 1.5 % parts by weight
White, Special Binder: 2 % parts by weight

UV-HV 7 is suited for printing onto glass. A subsequent heat-forced drying at 160°C for 30 min is very important. Pot life of the ink/hardener mixture is at least 8 h.

UV-HV 7 can also be used on other substrates such as metals or plastics. However, preliminary trials are essential.

Thickening agent STM

Addition: 0.5 - 2 % parts by weight

Auxiliary to enhance the ink viscosity without influencing significantly the degree of gloss. Please stir well! The use of an automatic mixing machine is recommended.

Thinner UVV2

Addition: 1 - 10 % parts by weight

Thinner for decreasing the print viscosity, to be used on high-speed printing machines or for bronzes. If an excessive amount is added, curing speed and surface durability of the printed ink film may be reduced. UVV2 thinner will be chemically bonded in the ink film during UV curing.

Levelling agent UV-VM

Addition: 0.5 - 1.5 % parts by weight

Auxiliary to rectify flow problems (e.g. bubbles etc.) which may be caused by residues on the substrate surface, or wrong press setting.

If an excessive amount is added, intercoat adhesion may be reduced. UV-VM must be stirred well.

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.

Ink residues mixed with adhesion modifier must be removed from the screen immediately after printing.

Fabrics, stencils

Selection of fabric depends on the printing conditions, the desired curing speed and yield as well as the required opacity. Generally, you can use all fabrics from 120-34 to 180-27 threads. Generally, a high even stretching of the fabric (>16 N) is important allowing a smooth ink application. For UV inks, all commercially available capillary films (15-20 µm) or solvent resistant photo emulsions and combined stencils can be used.

Mileage

Depending on fabric and substrate, the approximate yield is about 60-80 sqm. per kg of ink.

Shelf life

Shelf life is strongly depending on the formulation/reactivity of the ink system, as well as on the storage temperature. It is max. 2 years for an originally closed can if stored in a dark place at 15 - 25 °C. In the case of changed storing conditions and especially at higher storing temperatures, shelf life will be reduced. In such cases, Marabu cannot be held responsible for any claims arising from that and our guarantee will no longer be valid.

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Labelling

For our ink type Ultraplus UVP and its additives and auxiliaries, there are current Material Safety Data Sheets available according to EC-regulation 1907/2006 covering in detail all relevant safety data including the labelling according to the present EEC regulations as to health and safety labelling requirements. Such health and safety data may also be obtained from the respective label.

Safety regulations 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 soiled 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 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 selection and testing of the ink for specific application is exclusively your responsibility.

Should, however, any liability claims arise, such claims 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.