

UV screen printing ink for rigid PVC, polystyrene, pretreated polyethylene and polypropylene, 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
- glass (decorative indoor use without influence of humidity)
- rigid PVC, polystyrene

Before printing on PET and PP, please keep in mind that the none-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 indus-

trial 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 high-glossy and brilliant at a best possible opacity. Ultraplus UVP has a hard cross-linking and will therefore 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, 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

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OpaqueBlack 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 storing tests can be increased by adding Adhesion Modifier UV-HV 4 or UV-HV 7 (according to the kind of drying).

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Fabrics, yield, stencil

Selection of fabric depends on the desired curing speed and yield, as well as the required opacity. Generally, you can use all fabrics from

120-34 (T) to 180-27 (SL) threads. For 4-colour-process prints, we recommend a fabric of 150-27 (SL), 150-31 (S), 165-27 (SL), 165-31 (S) or 180-27 (SL), 180-31 (S) threads (all in plain weave). Generally, a high even stretching of the fabric (>16 N) is important allowing a smooth ink application.

Depending on fabric and substrate, the approximate yield is about 60-80 sqm. per kg of ink. For UV inks, all commercially available capillary films (15-20 µm) or solvent resistant photo emulsions and combined stencils can be used.

Cleaner

Cleaner is UR3. Ink residues mixed with adhesion modifier must be removed from the screen immediately after printing.

Range

13 mono-pigmented basic shades are included in the Ultracolor Colour System. This ink type is further stored in our Marabu-ColorFormulator (MCF).

Basic shades

Please compare shade card Ultracolor

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

Further shades available

UVP 170	Opaque White
UVP 180	Opaque Black

Shades for 4-colour process prints

UVP 429	Process Yellow (Yellow)
UVP 439	Process Red (Magenta)
UVP 459	Process Blue (Cyan)
UVP 489	Process Black (Black)

By using these basic shades in accordance with the mixing ratios provided by the Marabu-Color-Manager (MCM 2.2) software, it is possible

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to produce shades of the popular colour reference systems PANTONE®, HKS®, and RAL. All shades are intermixable. To maintain the special characteristics of this outstanding ink range, UVP should not be mixed with other ink types, except Ultrastar-M UVSM.

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 and do not contain heavy metals.

We **do not** recommend, however, printing on-to toys for small children due to possible direct mouth contact as we cannot exclude the potential content of unpolymerized monomers and reduction products of photoinitiators or photo-coinitiators. For printing onto packings for food or consumer goods, we recommend a migration test of the finished product.

Additives

Special Binder UVP 904

- as bronze binder or printing varnish
- to increase the curing speed
- to dilute the ink

An addition of Special Binder UVP 904 (1-25% parts by weight) accelerates the curing speed of colour shades and reduces opacity and weather resistance for outdoor use at the same time.

UVF 409 Transparent Base

Thixotropic auxiliary for 4-colour-process prints, fine details or reverse printing. By adding the transparent base to the 4-colour-process ink, the ink's density is reduced and thus adjusted to the sample.

Bronzes

(to be mixed with Special Binder UVP 904)

- | | |
|-------|--------------------------------|
| 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) |

All figures in brackets are guidelines which can be changed depending on opacity and curing speed. The ratio figures in brackets refer to the mixture bronze binder UVP 904 to bronze powder, the first figure standing for the parts by weight of bronze binder UVP 904. Bronze mixtures cannot be put into storage for later use. Therefore, prepare fresh mixes daily (to be processed within 8 h). We recommend fabrics such as 120-34 (T) or 120-31 (S).

High-Gloss Bronze Pastes

There are 5 high-gloss bronze pastes available, to be mixed with UVP 904 Special Binder. The mixing ratio can be varied according to the required opacity, ink price, and curing speed.

- | | |
|----------|-----------------------------|
| S-UV 191 | High-gloss Silver (4:1-7:1) |
| S-UV 192 | Rich Pale Gold (4:1-7:1) |
| S-UV 193 | Rich Gold (4:1-7:1) |

These 3 bronze mixtures have a shelf life of at least 6 months, they are high-glossy with medium opacity and an acceptable price.

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

These both bronzes are high-glossy with a good opacity and brilliance. Pot life is approx. one day, price is higher.

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. For further information, please refer to our Data Sheet 'High-gloss bronzes'.

Mixability

The high gloss of UVP can be decreased by adding the matt Ultrastar-M UVSM. Please prepare only the quantity for one working day.

Auxiliaries

Thinner UVV2

Thinner for decreasing the print viscosity, to be used on high-speed printing machines or for bronzes.

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Addition: 1 - 10 % parts by weight

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.

Adhesion Modifier UV-HV 1

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:

- to improve adhesion on coated papers and cartons (e. g. Chromolux)
- to improve adhesion on metals
- UV-HV 1 is **not** suitable for printing onto plastic

Addition: 0.5 - 2 % parts by weight

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

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

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

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

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. Addition as follows:

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

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

Accelerator UV-B 1

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

Addition: 1 - 2 % parts by weight

Levelling agent UV-VM

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

Addition: 0.5 - 1.5 % parts by weight

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

Thickening agent STM

Auxiliary to enhance the ink viscosity without influencing significantly the degree of gloss.

Addition: 0.5 - 2 % parts by weight
Please stir well! The use of an automatic mixing machine is recommended.

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 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 according to EC-regulation 91/155 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 skin irritating material, therefore, we recommend that all UV-curing screen printing inks and auxiliaries should be handled with particular care.

Skin polluted with ink must be cleaned immediately with water and soap. Follow the instructions given on the labels and in the Material 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.