

Ultrapack UVPK



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

High gloss, press-ready, good opacity, high product resistance

Vers. 2
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Field of Application

Substrates

Ultrapack UVPK is a universal UV-screen printing ink suitable for the following substrates:

- Pre-treated polyethylene PE and polypropylene PP
- Pre-treated and non pre-treated polyester PET and PETG
- PVC

Before printing onto PET and PP, please keep in mind that the non-polar and thus small surface tension of the substrate surface must be treated by flaming in the usual way. By this process, the surface tension will rise and a very good adhesion from 52 - 58 mN/m 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 approx. 30 sec.

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

Due to the processing parameters, the PET substrate can show great differences in surface tension which can be rectified by a pre-treatment with a 'soft' gas flame.

The adhesion of Ultrapack UVPK on PVC is very good considering, however, the embrittlement of PVC by 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 suitability for the intended use.

Field of use

Ultrapack UVPK is a one-component screen printing ink curing under UV-light which has been developed for the particular requirements and different substrates of container printing.

Characteristics

Ink characteristics

Ultrapack UVPK colour shades are brilliant and high-glossy with best possible opacity. Further characteristics:

- press-ready
- fast curing
- flexible ink film, e. g. for tubes
- high filler resistance
- good water resistance
- Opaque White 170/171 for dark substrates
- can be overembossed with hot embossing foil

Adjustment of the ink

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

For a maximum adhesion and resistance to chemicals and water on different substrates, there are various adhesion modifiers available, please see chapter "Additives and Auxiliaries".

Curing

Ultrapack UVPK is a fast curing UV-ink. A UV-curing unit with one medium pressure Mercury Vapour Lamp (power 120- 180 W/cm) will cure UVPK at a belt speed of 2000 - 6000 prints/h.

UVPK Opaque White 170/171 and UVPK Opaque Black 180 cure more slowly due to their high amount of pigments.

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The curing speed of the ink is generally depending on the kind of UV-curing unit (reflector), 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.

Ultrapack UVPK is a slightly post curing UV-ink. The ink film must withstand a crosscut tape test after having been cooled down to room temperature. After 24 hours, the printed ink film will achieve its maximum product and water, as well as rub resistance.

Fade resistance

Pigments of medium to high fade resistance are used in the Ultrapack UVPK ink type. Owing to this, all UVPK shades are generally suited to an indoor, as well as a limited outdoor use of up to one year related to the moderate Central European climate.

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 and other usual alkaline and acid fillers. The resistance to water storing tests can be increased by adding 2-4 % of Hardener H 2 as adhesion modifier.

Fabrics, productivity

The fabric selection depends on the printing conditions, the desired curing speed and productivity, as well as the requested opacity. Generally, you can use fabrics of 120-31 to 180-31.

For 4-colour-process prints, we recommend finer fabrics of 150-27 to 180-27. A uniform screen tension (14-18 N) of all fabrics used is further important.

Productivity is approx. 60-80 sqm. per kg ink.

Stencils

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

Cleaner

The appropriate Cleaner is UR 3. Ink residues mixed with adhesion modifier must be removed from the screen immediately after printing.

Range

13 mono-pigmented basic shades, see colour chart 'System Ultracolor'

Basic shades

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

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

The basic shades according to System Tampacolor are included in our Marabu-ColorFormulator. They build the basis for the calculation of individual colour matching formulas, as well as for shades of the common colour reference systems Pantone®, HKS®, and RAL®

All formulas are stored in the Marabu-Color Manager 2 (MCM 2) software.

All shades are based on organic pigments, therefore, the heavy metal content complies with the EEC regulations EN 71, part 3, "Safety of toys" - migration of specific elements.

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Due to a possible direct contact with the mouth, however, **we do not recommend** to use this ink neither for baby bottles or toys, nor for food packaging in direct contact with food since the possible presence of residual monomers and degradation products of the photoinitiators cannot be completely excluded even if sufficiently cured.

For the print on packagings for food or consumer goods, we recommend a migration test of the finished product.

Further shades available

UVPK 170	Opaque White
UVPK 171	Thixotropic Opaque White
UVPK 180	Opaque Black

Opaque White 171 has a higher thixotropy thus showing reduced flow properties in the screen at machine stops.

Shades for 4-colour process prints

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

Additives

Special Binder UVPK 904

- accelerates the curing process
- extends the ink
- to be used as bronze binder or printing varnish

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

Transparent Paste UVPK 409

Thixotropic auxiliary to aid 4-colour-process prints, fine detail or reverse printing. By adding transparent paste to the 4-colour-process ink, the ink's density is reduced and adjusted to the sample.

Bronzes

(to be mixed with bronze binder UVPK 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 according to the required opacity and curing speed. The ratio figures in brackets refer to the mixture Bronze Binder UVPK 904 to bronze powder whereas the first figure is standing for the parts by weight of Bronze Binder UVPK 904.

Due to the larger pigment size of bronze pigments, we recommend a fabric of 120-34 or 120-31. Bronze mixtures cannot be put into storage for later use. Prepare fresh mixes daily (to be processed within 8 h).

High-Gloss Bronze Pastes

Furthermore, five high-gloss bronze pastes are available to be mixed with UVPK 409. The mixing ratio can be varied as to the required opacity, ink price, and curing conditions.

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 can be stored for at least 6 months, they have a high gloss and an acceptable price at medium opacity.

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

These both bronzes have a high gloss and a good opacity, they are very brilliant at a higher ink price and pot life of one day.

The ratio figures in brackets refer to the mixture Special Binder UVPK 904 to bronze paste whereas the first figure is standing for the parts by weight of Special Binder UVPK 904.

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Auxiliaries

Thinner UVV4

Thinner for reducing the printing viscosity to be used on high-speed printing machines and for processing printing bronzes. The reactivity of the printed ink film is slightly increased.

Max. addition: **1 - 10 %** parts by weight

If an excessive amount is added, curing speed and surface durability of the printed ink film can be reduced. Thinner UVV4 will be bonded chemically in the ink film when curing.

UV-HV 4 Adhesion Modifier

UV-HV 4 improves adhesion of UVPK on difficultly printable high-glossy PP or PET, as well as generally of heavily overcured colour shades when overprinting them. The best possible adhesion and scratch resistance is achieved after 12 to 24 hours only (please carry out preliminary trials!).

Addition: **0,5 - 4 %** parts by weight
White 970, 170, 171: **2 %** parts by weight

UV-HV 4 must be stirred well into the ink. Ink mixtures cannot be put into storage for later use, please prepare fresh mixes (to be processed within 2 to 4 h).

Hardener H 2 (as adhesion modifier)

By adding H 2, the water resistance and in special cases, adhesion to the substrate can be improved.

Addition: **2 - 4 %** parts by weight
White 970, 170, 171: **2 %** parts by weight

H 2 must be stirred well into the ink. UVPK mixtures with H 2 cannot be stored for later use. Please prepare fresh mixes (to be processed within 4 to 6 h).

Accelerator UV-B1

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

Accelerator UV-B2

Accelerates the curing speed, and increases the surface hardness of the ink further improving the degree of gloss.

Addition: **1 – 4%** parts by weight

UV-VM Levelling agent

Auxiliary to rectify flow problems (e.g. bubbles etc.) which may be caused by residues on the substrate's surface, too low screen tension or wrong machine setting.

Addition: **0.5 - 1.5 %** parts by weight

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

STM Thickening agent

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 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 if stored in a dark room at a temperature of 15 to 25 °C. Under different conditions, particularly higher storage temperatures, the shelf life is reduced. In such cases, Marabu's warranty expires.

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Safety Regulations for UV Screen Printing Inks

We recommend that UV screen printing inks and auxiliaries should be handled with particular care. Follow the instructions given on the labels and in the Material Safety Data Sheets.

Labelling

For our ink type Ultrapack UVPK 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 EC regulations as to health and safety labelling requirements.

Such health and safety data may also be obtained from the respective label.

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.