

**UV-curable screen printing ink for PVC, PE and PP self-adhesive foils, rigid and soft PVC, polyester foils, adhesion foils, paper, pasteboard, cardboard**

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

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## Field of Application

### Substrates

Ultra Star UVS is suitable for printing onto:

- PVC self-adhesive and adhesive foils
- PE and PP self-adhesive foils, Corona-pre-treated or print varnished
- Rigid and soft PVC
- Pre-treated polyester foils
- Corrugated board, cardboard, and paper

Before printing onto PE and PP, please keep in mind that the substrate surface must be pretreated by flaming/corona. By this process, the surface tension will rise and from 44 mN/m, a very good adhesion is possible. The surface treatment can be tested by appropriate test inks. The substrate surface must be absolutely free of disturbing residues such as grease, oil, and finger sweat.

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

The high-gloss Ultra Star UVS is suitable for industrial label printing and as a universal ink type for graphic screen printing. As a result, the main application is on self-adhesive foils.

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 / Tampa® Tex TPX.

## Characteristics

All UVS color shades are very brilliant at high gloss and best possible opacity.

Further characteristics:

- Good flexibility of the printed ink film
- Cutting and punching in the ink film possible
- High fill good resistance
- High mechanical resistance to abrasion
- Good weather resistance for outdoor use
- Can be embossed with hot embossing foil
- Opaque White 170 for dark substrates
- Not mouldable
- Limited weldability

### Ink Adjustment

#### Recommendation

The ink should be stirred homogeneously before printing and if necessary during production.

Due to the various substrates and different printing machines, printing speeds and UV drying units existing in the market, UVS can be modified with various additives in its reactivity, viscosity, and adhesion characteristics.

### Drying

Ultra Star UVS 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 120-180 W/cm) cure the UVS at a belt speed of 15-30 m/min. Due to their higher pigmentation, Opaque White UVS 170 and Opaque Black UVS 180 require a reduction of the printing speed (approx. 10-20

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m/min).

The curing speed of the ink is generally dependant upon the kind of UV-curing unit (reflectors), number, age, and power of the UV-lamps, the distance between UV lamps and substrate, the printed ink film thickness, color shade, substrate in use, as well as the exposure time to the curing unit.

Ultra Star UVS is a post-curing UV ink which will achieve its final adhesion and resistances after 24 h. 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 completely cured, otherwise they are subject to the same disposal rules as liquid ink residues (hazardous waste).

## Fade resistance

Pigments of high fade resistance are used in the Ultra Star UVS range. If processed according to professional knowledge, all prints with basic shades are suitable for outdoor use of three years if placed vertically and referred to the middle European climate, north of the forty-fifth degree of latitude.

In case mixtures contain special binder or white, or the density of the printed ink film is reduced, and/or the print is used in a climate zone with more sun and UV-light, the fade and weather resistance will be reduced.

## Stress resistance

After proper and thorough drying, the ink film exhibits outstanding adhesion as well as rub, scratch, and block resistance. It is highly resistant to solvents, alcohol, water, and other usual

fillers. UVS has a limited ability to be formed and cannot be moulded.

## 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

### High Opaque Shades

170	Opaque White
180	Opaque Black

### Further Products

904	Special Binder
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All shades are intermixable. 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 color matching formulas, as well as for shades of the common color 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	14-25%
S-UV 192	Rich Pale Gold	14-25%
S-UV 193	Rich Gold	14-25%
S-UV 291	High Gloss Silver	10-25%
S-UV 293	High Gloss Rich Gold	10-25%

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## Metallic Powders

S 181	Aluminium	17%
S 182	Rich Pale Gold	20%
S 183	Rich Gold	20%
S 184	Pale Gold	20%
S 186	Copper	25%
S 190	Aluminium, rub-resistant	17%

These metallics are added to UVS 904 in the recommended amount, whereat 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. Due to their chemical structure, the processing time of mixtures with Pale Gold S 184 and Copper S 186 is even reduced to 4 h.

Owing to the smaller pigment size of Metallic Pastes it is possible to work with finer fabrics like 140-31 to 150-31.

Owing to the bigger pigment size of Metallic Powders we recommend the use of a coarser fabric like 100-40.

Shades made of Metallic Powders are always subject to an increased dry abrasion which can only be reduced by overvarnishing.

All metallic shades are displayed in the Marabu "Screen Printing Metallics" color chart.

## Auxiliaries

UVV 2	Thinner	1-10%
UV-B 2	UV Accelerator	1-4%
UV-B 1	UV Accelerator	1-2%
STM	Thickening Agent	0.5-2%
UV-HV 4	Adhesion Modifier	0.5-2%
UV-VM	Levelling Agent	0.5-1.5%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	

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 1 accelerates the curing speed if necessary and may increase the adhesion to the substrate owing to a better depth curing.

UV-B 2 accelerates the curing speed, increases the surface hardness of the ink film, and improves the degree of gloss.

UV-HV 4 improves the adhesion on highly cross-linked substrates or when over-printing overcured color shades. The best possible adhesion and scratch resistance is achieved after 12-24 h (preliminary trials are necessary!).

UV-HV 4 must be stirred well into the ink. Ink mixtures with UV-HV 4 are not storable, so we recommend to prepare mixtures which can be processed within 2-4 h.

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 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 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. For 4-color process inks, we recommend fabrics between 150-27 and 180-31 (all in plain weave). A high and uniform screen tension (> 16 N) is further important to guarantee a defined ink deposit. For UV inks, all commercially available capillary films (15-20 µm) or sol-

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vent resistant photo emulsions and combined stencils can be used.

## Shelf Life

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

For an unopened ink container it is **2.5 years**.

We recommend our products to be stored in a dark, dry and well-ventilated surrounding, providing an ambient temperature of 5 °C - 35 °C. Please protect from heat and direct sunlight. If storage conditions do not comply with this recommendation, the shelf life is no longer guaranteed.

## 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 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 Star UVS 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 in-

cluding labelling according to EC regulation 1272/2008 (CLP regulation). Such health and safety data may also be derived 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 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.

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