

Product Data Sheet

Screen Printing Ink

UV/K

UV-curing Screen Ink Range, 1- and (alternatively) 2-Component

APPLICATION

UV screen printing inks for technical and industrial applications.

UV/K is mainly used for decoration of e.g. front panels made of metal and coated surfaces as well as for duroplastics. They are also suitable for legend printing on PCB's.

PROPERTIES

- Solvent-free screen printing inks UV/K are UV curing.
- UV/K inks are delivered in a ready-to-print adjustment. They result in a glossy finish.
- Because of the very high degree of cross-linkage of the binder, UV/K screen inks require high UV energy values for curing.
- The cured ink film shows excellent mechanical abrasion resistance and good chemical resistance.
- Due to the binders screen printing inks UV/K are not suitable for outdoor applications.
- If required, UV/K inks can be processed alternatively as 2-component ink with 5% hardener Additive UV/H to improve ink adhesion on the above mentioned substrates.
- Note on multi-layer printing:
The very high mechanical and chemical resistance of the cured UV/K ink film – which is due to the high level of cross-linking – may affect intermediate adhesion. This can often be avoided by reducing the UV curing energy when curing the lower ink layer(s). However, this must be confirmed carrying out corresponding pre-trials. At the same time, you have to check if the prints still meet the resistance requirements.
- Note: Because of the variety of metals, coatings and duroplastics, pre-tests to confirm suitability of UV/K inks are essential.

COLOUR SHADES - OVERVIEW

- Mixing System: C-MIX 2000 12 colour shades for mixing of RAL, PMS and HKS colours.
- Special inks: Colour shades for legend printing of PCB's.
- Special colour shades are available upon request.
- More information about available colour shades in the detailed tables in section Colour Shades.

CHOICE OF PIGMENTS AND LIGHT FASTNESS

Colour shades of UV/K ink range contain pigments with a high light fastness. Light fastness and weather resistance will reduce if thinner layers are applied or if base colours are mixed with a high ratio of white or varnish.

Due to the binders screen printing inks UV/K are not suitable for outdoor applications.

ADJUSTMENT FOR SCREEN PRINTING

- Screen printing inks UV/K are supplied in a ready-to-print adjustment. Generally, addition of auxiliary agents is not necessary.
- For some rare and special applications and depending on local conditions, addition of certain agents/additives is possible.
- Prior to printing, the inks should be stirred well to obtain a homogeneous dispersion of all ingredients.

AUXILIARY AGENTS

Application	Product	Addition in % by weight	Additional Information
Thinning	Additive UV/V*	Max. 10%	Standard thinner
Viscosity increase	Thickening powder	1 - 2%	Stir with mixer
Matting	Matting powder	5 - 10%	Stir with mixer
Reactivity increase	LAB-N 551564	1 - 3%	Photoinitiator
	LAB-N 560700	3 - 5%	Photoinitiator
Flow agent	Additive UV/VM	1 - 2%	Do not overdose!
	Additive UV/N	1 - 2%	Wetting agent, also promotes flow properties.
Hardener	Additive UV/H	5%	Stir with mixer (pot life!)

* Thinner Additive UV/V is a reactive UV monomer, not a commercial solvent!

OVERPRINTING

Generally, it is not necessary to overprint UV/K inks with varnish.

BRONZE COLOURS, MIXING OF BRONZE INKS

The following bronze colours with a stable shelf life are available upon request

- Silver: UV/K 79-256
- Gold: upon request

Printers can mix bronzes themselves using bronze pastes B 75, B 76, B 77 and B 79 as well as bronze powder B 78-POWDER.

These "B" bronze pastes and "B" bronze powder are mixed with varnish UV/K-E50 prior to processing.

Mixing ratios in parts by weight:

Gold bronze paste/powder to UV/K-E50 = 1 : 3 - 4

Silver bronze paste to UV/K-E50 = 1 : 4 - 5

- **Note:** Depending on printing conditions, an addition of 2% photoinitiator LAB-N 560700 may be required to increase reactivity.
- **Note:** For technical reasons these mixtures only have a pot life of approx. 6 - 8 h! Afterwards ink will thicken and become solid.
- **Note:** B bronzes are prone to oxidation (Exception B 78 POWDER). Therefore, overprinting with UV/K-E50 is recommended.
B 78-POWDER does not tend to oxidation. The pale copper shade will not darken with time.

DRYING / UV-CURING

- UV/K inks only dry/cure under UV-radiation.
- Suitable UV-driers with Hg medium-pressure lamps (250 – 400 nm) and an efficiency between 80 and 200 W/cm have to be used.
- Preferably, use reflectors with a focussed radiation.
- Ensure an even radiation (intensity/distance to the lamps) of the whole printed image.
- Curing parameter depend on thickness of printed ink layer, colour, substrate or substrate quality and temperature as well as construction and performance of the UV drier.
- Curing energy required depends on number of printed ink layers (check intermediate adhesion), printed layer thickness, colour and type of substrate. Hence, printers should determine the exact required energy with their own UV-drier.
- UV/K inks require relatively high energy values for UV curing.

UV-curing energy guide values:

(printed with 150-31 fabric, white substrate)

UV-energy: approx. 1000 mJ/cm²

(measured with Kühnast UV-integrator, 250 – 410 nm, max. 365 nm)

Belt speed: **UV-radiator:** 1 x 120 W/cm: 3 m/min.

2 x 120 W/cm: 6 m/min.

- Adhesion should only be checked several minutes after curing. Due to the post-curing process of the ink and depending on the substrate, sufficient adhesion may sometimes only be achieved after up to 24 hours.

Hardener:

Alternatively, screen inks range UV/K can be processed as 2-component ink with **hardener Additive UV/H** to increase ink adhesion on difficult substrates.

UV/K and hardener Additive UV/H are mixed at a ratio of **ink : hardener = 20 : 1** (parts by weight).

Hardeners are sensitive to humidity. Therefore, containers always have to be tightly closed.

Pot life:

- Ink mixed with hardener may only be processed within a limited period of time (=pot life)
- **Pot life of UV/K + hardener is approx. 8 h (at 20°C).**
Higher temperatures will reduce pot life.
- We do not recommend processing the inks for longer than the pot life as adhesion and resistance properties will then continually deteriorate, even if the ink still seems to be liquid and processable.

Hardener Reaction

Basically, the increased adhesion properties influenced by the hardener are only achieved after photochemical UV curing by a further chemical cross linkage reaction between ink and hardener. This cross linkage reaction depends on time and temperature (reaction time). After UV curing, prints should be stored for at least 72 hours at a temperature > 15°C.

Cross-linkage reaction will be much quicker using higher temperatures e.g. by oven curing:

at 80°C / 60 min. at 140°C / 20 min.

Resistance Tests

Resistances should not be checked before prints have cooled down and ink has fully cured/cross-linked.

SCREEN FABRIC / STENCILS

UV/K inks are formulated for printing with fabrics of 120 – 150 threads/cm. Printability and especially UV-curing properties with coarser or finer fabrics should be evaluated by corresponding trials.

All copy emulsions and capillary films suitable for solvent based and UV-curing screen inks can be used, such as our program of SunCoat or Murakami products.

CLEANING

Uncured UV inks can be removed from stencils and tools using our solvent based universal cleaning agents of the URS range.

Cleaning of cured UV inks is very time-consuming and hardly ever possible.

Note: As the acrylates contained in these UV inks may cause skin irritation, clean contaminated skin with water and soap immediately. Remove and clean contaminated clothing straightaway.

PACK SIZE

Screen printing inks UV/K are delivered in 1 litre containers. Other pack sizes are available upon request.

SHELF LIFE

In closed original containers, UV/K inks generally have a shelf life of 2 years from date of production.

For exact date of expiry, please refer to the label.

SAFETY DATA SHEETS

Read safety data sheet prior to processing.

Safety data sheets comply with Regulation (EC) No. 1907/2006 (REACH), Appendix II.

CLASSIFICATION AND LABELLING

Hazard classification and labelling comply with Regulation (EC) No. 1272/2008 (CLP/GHS).

CONFORMITY

Coates Screen Inks GmbH does not use any of the substances or mixtures to produce printing inks, which are banned according to the EUPIA (European Association of the Printing Inks Industry) exclusion policy. Further compliance confirmations are available upon request.

ADDITIONAL INFORMATION ABOUT OUR PRODUCTS

Product data sheets: Auxiliary Agents for UV-Curing Screen Printing Inks
 Brochures: UV-Curing Screen Printing Inks
 Internet: Various technical articles are available for download on www.coates.de, section "SN-Online"

COLOUR SHADES

C-MIX 2000 BASE COLOUR SHADES Mixing system for matching of PMS, HKS, RAL colours (on white substrates) Start formulations available in data base „Formula Management C-MIX 2000“ According to colour card C-MIX 2000					
primrose	UV/K-Y30	red	UV/K-R50	green	UV/K-G50
golden yellow	UV/K-Y50	magenta	UV/K-M50	black	UV/K-N50
orange	UV/K-O50	violet	UV/K-V50	white	UV/K-W50
scarlet	UV/K-R20	blue	UV/K-B50	varnish	UV/K-E50
COLOUR SHADES FOR LEGEND PRINTING OF PCB´S These special colours do not have any identification number					
white	UV/K-WEISS	black	UV/K-SCHWARZ		
white, highly opaque	UV/K-WEISS-HD				
4 COLOUR PROCESS INKS (CMYK) According to colour card STANDARD 1 for screen printing inks					
upon request					
SPECIAL PRODUCTS: Special Colour Shades, Vanishes, Pastes Information about availability upon request.					
silver	UV/K 79-256				

Matching of PMS, RAL, NCS colours and special shades upon request.

In some individual cases the product characteristics of special colour shades and modifications of this ink type manufactured upon customer request may differ from the above properties.

The statements in our product and safety data sheets are based on our present experiences, however they are no assurance of product properties and do not justify a contractual legal relationship. We provide these details to inform customers about our products and their possible applications. However, on account of various factors influencing processing of our products it is absolutely essential to carry out printing trials under local production conditions. Choice of individual ink types and their suitability for the intended application is the sole and entire responsibility of the user. We do not assume any liability for any problems of technical or process-related nature. Any liability shall be limited to the value of the goods delivered by us and processed by the user.

All former product data sheets are no longer valid.

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