Product Data Sheet
Screen Printing Ink

SunChemical®
Coates Screen Inks

Z/PVC

Solvent Based Screen Ink Range, 1- and (alternatively) 2-Component

APPLICATION

Screen ink range for printing on thermoplastics such as PVC, PMMA (acrylic glass), front panels made of polycarbonate (PC) or PC/ABS polymer blends. Also suitable for pre-treated polypropylene (PP) and polyethylene (PE).
Note: Z/PVC inks are not suitable for printing on polystyrene (PS) materials.

PROPERTIES

- Screen inks Z/PVC are solvent based screen printing inks. They can be processed as 1-component and (alternatively) as 2-component ink with hardener.
- Processed as 1-component ink Z/PVC dries physically, as 2-component ink physically chemically-reactive and results in a satin gloss finish.
- Processed as 1-component ink (= without hardener) Z/PVC inks show good alcohol resistance.
- Processed as 2-component ink (= with hardener) Z/PVC exhibits good resistances against various solvents and filling materials. 2-component processing will also further increase ink adhesion properties on difficult substrates such as pre-treated PP/PE.
- Z/PVC inks are suitable for long-term outdoor applications.
- Note: Because of the variety of substrates, pre-tests are essential. It is also advised to check efficiency of possibly required pre-treatment of substrates (cleaning/degreasing, flame/corona/plasma treatment) or maybe even post-treatment (flame-drying).

COLOUR SHADES - OVERVIEW

- Mixing System: C-MIX 2000 12 colour shades for mixing of RAL, PMS and HKS colours.
- Opaque: Standard Colour shades with medium to good opacity.
- 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 Z/PVC 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.

Applied on suitable substrates Z/PVC inks are suitable for long-term outdoor applications.

ADJUSTMENT FOR SCREEN PRINTING

- Screen printing inks Z/PVC are not supplied in a ready-to-print adjustment.
- **Processed as 1-component ink (without addition of hardener):**
  Ink is adjusted to printing consistency by addition of thinner or retarder (stir with mixer or agitator).
- **Processed as 2-component ink (with addition of hardener):**
  As 2-component ink Z/PVC inks have to be mixed with hardener at a specified ratio prior to processing. Thinner is added after addition of hardener.
  The mixed ink should be allowed to pre-react for approx. 15 minutes prior to processing (recommendation). Processing is then possible for a specified period of time (=pot life).

Hardener:
Alternatively, screen inks range Z/PVC can be processed with **hardener Z/H or ZH/N.**
Z/PVC inks and hardener have to be mixed at a specified ratio (parts by weight):

- **Hardeners Z/H or ZH/N:** Mixing ratio: **Ink : Hardener = 10 : 1**
- Hardener Z/H is not suitable for outdoor applications (tends to yellowing).
- Hardener ZH/N is suitable for outdoor applications.
- 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 Z/PVC + hardener Z/H or ZH/N 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.

THINNERS / RETARDERS
Depending on local conditions ink is adjusted to printing consistency by addition of 15 – 25 % of thinner or retarder.

For adjustment of screen inks Z/PVC, the following products are available:

Thinner:	■	**VD 30**	**Standard thinner**
Retarder:	■	**VZ 25**	**Medium retarder**
	○	VZ 40	Very slow retarder

■= Preferred ○= Suitable

Depending on printing conditions, the products listed above can be mixed into the inks individually or as mixtures. Please note that depending on evaporation rate of the thinner/retarder used drying times may be longer.
Thinner/retarder should be mixed into the ink thoroughly using a mixer or agitator. In addition, inks should be stirred well prior to each processing to obtain a homogeneous dispersion of all ingredients.

ADDITIONAL AUXILIARY AGENTS

Application	Product	Addition in % by weight	Additional Information
Retarder paste	LAB-N 111420/VP	Max. 10%	Possibly slightly reduced gloss
Viscosity increase	Thickening powder	Max. 3%	Stir with mixer
Matting	Matting powder	Max. 5%	Stir with mixer
Flow agent	VM 1	0.3 to 0.5%	Do not overdose!

OVERPRINTING
Generally, it is not necessary to overprint Z/PVC inks with varnish. However, overprinting to increase resistances of ink layers is possible with Z/PVC-E50 or Z 70/PVC-NT.

BRONZE COLOURS, MIXING OF BRONZE INKS
Bronze colours may be available 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. For examples of colour shades please refer to our Bronze Colour Card.
These “B“ bronze pastes and “B” bronze powder are mixed with bronze binder ZB/PVC or varnish Z/PVC-E50 prior to processing.

Mixing ratios in parts by weight:

Gold bronze paste/powder	to	ZB/PVC or Z/PVC-E50	=	1 : 4 - 5
Silver bronze paste	to	ZB/PVC or Z/PVC-E50	=	1 : 5 - 6

Contrary to AB and MG bronze colours, B bronzes are prone to oxidation (exception B 78-POWDER). Therefore, they should be overprinted, e.g. with Z/PVC-E50. B-bronzes are not recommended for long-term outdoor applications.

B 78-POWDER does not tend to oxidation. The pale copper shade will not darken with time. Colour of inks mixed with B 78-POWDER is similar to colour 78/AB as shown on our “bronze colour card”.

Note: When overprinting bronze colours (B/ AB/ MG) with varnish or other colour shades, it is essential to carry out pre-tests to check intermediate adhesion of the ink layers (fingernail test, tape test).

DRYING / HARDENER REACTION

1. **Processing WITHOUT addition of hardener:**
   Ink dries physically, i.e. by evaporation of solvents.
2. **Processing WITH addition of hardener Z/H or ZH/N:**
   First, ink dries physically, followed by chemical cross-linkage reaction.
   The following drying and reaction temperatures are essential:
   - Hardener Z/H: > 15°C
   - Hardener ZH/N: > 20°C

Drying

Drying times below are only approximate as drying properties depend on various factors:

- Type and amount of thinners/retarders used.
- Thickness of printed ink layer.
- Drying temperature.

Depending on local conditions, drying time in a drying frame (rack) is approx. 10 minutes at room temperature (20°C). Drying time with heat application (hot air fan/oven) is about 60 seconds at a temperature of 50°C.
Note: Addition of retarders may result in much longer drying times!

Hardener Reaction

Basically, the special adhesion and resistance properties of the ink are achieved only by chemical cross linkage reaction between ink and hardener. This cross linkage reaction depends on time and temperature.

The following are guide values only:

Temperature	Time approx.	Condition of ink	Condition of ink film
<15°C air drying		Hardener Z/H does not react!	Ink film will not achieve any resistance
<20°C air drying		Hardener ZH/N does not react!	Ink film will not achieve any resistance
20°C air drying	10 min.	Dry enough for overprinting	No increase of resistance yet
	>72h	High degree of cross-linkage	Very high resistance values achieved
	>5 days	Maximum cross-linkage	Maximum resistance achieved
80°C oven curing	approx. 3 min.	Dry enough for overprinting	No resistance yet
	60 min.	Very high degree of cross-linkage	Very high resistance values achieved

Resistance Tests

When processing Z/PVC inks with hardener Z/H or ZH/N resistances should not be checked before the ink has fully cured/cross-linked: Drying with 20°C/5 days, with 80°C/>60 minutes.

SCREEN FABRIC / STENCILS

Z/PVC inks have been formulated for printing with fabrics ranging from 77 to 120 threads/cm. Suitability for printing with coarser or finer fabrics should be determined by corresponding pre-trials.
All copy emulsions and capillary films suitable for solvent based screen inks can be used, such as our program of SunCoat or Murakami products.

CLEANING

Stencils and tools can be cleaned with our universal cleaning agents URS or URS 3.
When processing as 2-component system, the longer inks dry on stencils and tools the harder will be their removal due to the chemical cross-linkage reaction. Therefore, always clean stencils and tools as soon as possible. Thinner VD 40 can be used to remove persistent ink residues.

PACK SIZE

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

SHELF LIFE

In closed original containers, Z/PVC inks generally have a shelf life of 5 years from date of production. Hardeners Z/H and ZH/N have a shelf life of 14 months from date of production, also in closed original containers.
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 for the production of 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. Screen printing inks range Z/PVC C-MIX 2000 colour shades, standard, highly opaque standard colours (HD), process colours, silver, fluorescent colours and transparent colours comply with the requirements of toy standard „EN 71-3:2019 Safety of toys – Migration of certain elements (category III: scraped off material).

ADDITIONAL INFORMATION ABOUT OUR PRODUCTS

Product data sheets:	Auxiliary Agents for Screen Printing HM
Brochures:	Solvent Based Screen Printing Inks
Internet:	Various technical articles are available for download on www.coates.de, section “SN-Online”; e.g. processing of 2 component inks

FOR COLOUR RANGES, PLEASE REFER TO NEXT PAGE.

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	Z/PVC-Y30	red	Z/PVC-R50	green	Z/PVC-G50
golden yellow	Z/PVC-Y50	magenta	Z/PVC-M50	black	Z/PVC-N50
orange	Z/PVC-O50	violet	Z/PVC-V50	white	Z/PVC-W50
scarlet	Z/PVC-R20	blue	Z/PVC-B50	varnish	Z/PVC-E50

STANDARD Colour Range (medium opacity)

According to colour card STANDARD 1 for screen printing inks
Availability of further standard shades upon request

citric yellow	Z 10/PVC-NT-NEU	ultra marine	Z 32/PVC-NT-NEU
medium yellow	Z 11/PVC-NT-NEU	dark blue	Z 33/PVC-NT-NEU
bright orange	Z 14/PVC-NT-NEU	violet	Z 36/PVC-NT-NEU
orange	Z 15/PVC-NT-NEU	light green	Z 40/PVC-NT-NEU
light red	Z 20/PVC-NT-NEU	dark brown	Z 51/PVC-NT-NEU
bright red	Z 21/PVC-NT-NEU	white	Z 60/PVC-NT-NEU
light blue	Z 30/PVC-NT-NEU	black	Z 65/PVC-NT-NEU

STANDARD Colour Range HD (high opacity)

According to colour card STANDARD HD for screen printing inks
Availability of further standard HD shades upon request

white, highly opaque	Z 60/HD-PVC-NT-NEU	black, highly opaque	Z 65HD-PVC-NT-NEU

SPECIAL PRODUCTS: Special Colour Shades, Varnishes, Pastes

Information about availability upon request

overprint varnish	Z 70/PVC-NT	bronze binder	ZB/PVC
matt varnish	Z 70/PVC-MT-NT	transparent paste	Z/TP-PVC
black, highly opaque HF weldable	Z 66/HD-PVC-NT		

4 COLOUR PROCESS INKS (CMYK)

According to colour card STANDARD 1 for screen printing inks

Upon request.

AB – BRONZE INKS and MG – METAL GLOSS INKS

According to Bronze Colour Card

Upon request.

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

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