

Product Data Sheet

Screen Printing Ink

ZMN

Solvent Based Screen Ink Range, 2-Component

APPLICATION

Screen printing inks for printing on pre-treated polyolefines, i.e. polypropylene (PP), polyethylene (HD-PE, LD-PE) such as beer crates and similar containers. Also, for coated and chromium-plated surfaces as well as for printing of various thermoplastics like PMMA (acrylic glass) and ABS and duroplastics (phenolic and melamine resins, glass-fibre reinforced polyester and epoxy resins).

PROPERTIES

- Screen inks ZMN are solvent based 2-component screen printing inks, which have to be processed with hardener.
- **In line with current safety requirements ZMN inks have been formulated with especially environmentally compatible raw materials. ZMN inks do not contain aromatics, butyl glycolate (GB-Ester), cyclohexanone, Bisphenol A (BPA) and also no polycyclic aromatic hydrocarbons (PAH).**
The only exceptions are AB bronzes 75/AB to 79/AB (contain aromatics) and black colour shades N50 and 65 (pigments contain PAH). AB-bronzes are only available upon request.
- **If the criteria to obtain the GS mark (category 1) according to GS specification AfPS GS 2014:01 PAH have to be met, the following applies:**
Colour shade black: Only colour shades N58, 68 or 68-HD-NT are suitable.
Bronze colours: Only MG bronzes are suitable (available upon request)
Thinner/Additives Only those products marked with symbol ☑ in this data sheet are suitable.
- ZMN inks show good printability. They dry chemically-physically and result in a glossy finish.
- This ink range is especially suitable for technical/industrial applications requiring high physical and chemical resistances.
- Fully cured prints show a good scratch resistance and a highly tough surface.
- ZMN inks exhibit good resistance against chemical cleaning agents.
- ZMN inks are suitable for long-term outdoor applications.
- Note: Because of the large variety of substrates, pre-tests are essential.

COLOUR SHADES - OVERVIEW

- Mixing System: C-MIX 2000 12 colour shades for mixing of RAL, PMS and HKS colours.
- Process Inks: „180“ colours 4 transparent colour shades according to ISO 2846-4.
- 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 ZMN 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 substrate screen printing inks ZMN are suitable for long-term outdoor applications.

ADJUSTMENT FOR SCREEN PRINTING

- Screen printing inks ZMN are not supplied in a ready-to-print adjustment.
- As this ink range is a 2-component system ZMN 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 within a specified period of time (=pot life) of approx. 6-8 hours/20 C°.

Hardener:

Screen printing inks ZMN have to be mixed with hardener prior to processing. The following hardeners are available:

Z/HN, also suitable for long-term outdoor applications

☒ Z/H. Hardener Z/H is not suitable for long-term outdoor applications (tendency to yellowing).

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

ZMN inks and hardeners have to be mixed at a specified ratio (parts by weight):

- **Hardener Z/H:** Mixing ratio: **Ink : Hardener = 4 : 1**
- **Hardener ZH/N:** Mixing ratio: **Ink : Hardener = 4 : 1 – 8 : 1**
Mixing ratio of ZH/N depends on the type of substrate and the required resistances and should be determined by corresponding pre-trials.
- **Varnish ZMN/E50:** Mixing ratio: **Varnish E50 : Hardener ZH/N = 3 : 1**

Pot life:

- Ink mixed with hardener may only be processed within a limited period of time (=pot life)
- **Pot life is approx. 6 - 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 (stir with mixer, agitator). Prior to each processing, the inks should be stirred well to obtain a homogeneous dispersion of all ingredients.

For adjustment of screen inks ZMN, the following products are available:

Thinner:	☒ ■ VD 60	Standard thinner (mild odour)
Retarder:	■ VZ 25	Medium retarder
	☒ ■ VZ 35	Slow retarder
	☒ ■ VZ 40	Very slow retarder

■ = Preferred ○ = Suitable ☒ = product is free of aromatics, butylglycolate, cyclohexanone, PAH

Note: Retarders VZ 10, VZ 20 and VZ 30 are not suitable for ZMN inks!

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.

ADJUSTMENT FOR SPRAY COATING APPLICATION

ZMN inks can also be applied with a spray gun. For these applications, ZMN inks are thinned with quick evaporating thinner ZVSP. Addition of thinner, usually >50%, depends on the required processing viscosity.

ADDITIONAL AUXILIARY AGENTS

Application	Product	Addition in % by weight	Additional Information
Retarder paste	ZMN/VP	Max. 10%	Possibly slightly reduced gloss
	LAB-N 111420/VP	Max. 10%	Possibly slightly reduced gloss
Antistatic paste	☒ STM-P1	Max. 10%	Possibly slightly reduces gloss
Viscosity increase	☒ Thickening powder	Max. 3%	Stir with mixer
Matting	☒ Matting powder	Max. 5%	Stir with mixer
Flow agent	VM 1	3 - 5%	Do not overdose!
	☒ VM11	3 – 5%	Do not overdose!

OVERPRINTING

Generally, it is not necessary to overprint ZMN inks with varnish. However, overprinting to increase resistances of ink layers is possible with ZMN/E50. Use of hardener ZH/N (varnish : hardener = 3 : 1) is recommended.

BRONZE COLOURS, MIXING OF BRONZE INKS

Bronze colours AB and MG (☒) are available upon request.

Note: When overprinting bronze colours AB or 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)

For technical reasons we do not recommend mixing B bronze colours of ZMN inks with our "B" bronze pastes and "B" bronze powder.

DRYING / HARDENER REACTION

Mixture of ZMN ink/hardener is a chemically-reactive system with a physical pre-drying.

- Ink dries physically by evaporation of solvents.
- Then the ink film cures by chemical cross-linkage reaction.
- Drying and reaction temperature of hardener Z/H must be at least 15°C and >20°C for hardener ZH/N.

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.

Hardener Reaction

The special adhesion and resistance properties of the ink are achieved only by chemical cross linkage reaction. 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	20 min.	Dry enough for overprinting	No resistance yet
	<12h	Overprinting still good	No resistance yet
	>72h	High degree of cross-linkage	High resistance achieved
	>5 days	Maximum cross-linkage	Maximum resistance achieved
80°C oven curing	5 min.	Dry enough for overprinting	No resistance yet
	60 min.	High degree of cross-linkage	High resistance achieved
140°C oven curing	30 min.	Maximum cross-linkage	Maximum resistance achieved

Resistance

Ink range ZMN can be used for a large range of partially quite demanding substrates. These materials may require pre-cleaning/degreasing or a mandatory pre-treatment of substrates such as flame, corona, plasma (e.g.

polyolefines) treatments. Duroplastics and coatings may show quite different qualities. Therefore, suitability should always be determined by pre-trials taking into consideration above processing parameters.

Resistances should not be checked before the ink has fully cured / cross-linked:

Drying: 20°C/> 72 h, 80°C/>60 Min., 140°C/30 min.

SCREEN FABRIC / STENCILS

ZMN 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

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 with our universal cleaning agents URS, URS 3 or thinner VD 40 as soon as possible.

Note: When producing prints for end products to be evaluated for compliance with PAH threshold values (e.g. AfPS GS 2014:01 PAH) we recommend to clean with our products VD 60 or UF/V.

PACK SIZE

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

SHELF LIFE

In closed original containers, ZMN inks generally have a shelf life of 5 years from date of production. Hardeners Z/H and ZH/N have a shelf life of 24 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. Screen printing inks range ZMN 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).

Further compliance confirmations are available upon request.

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"

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	ZMN/Y30	magenta	ZMN/M50	black, PAH-free	ZMN/N58
golden yellow	ZMN/Y50	violet	ZMN/V50	white	ZMN/W50
orange	ZMN/O50	blue	ZMN/B50	varnish	ZMN/E50
scarlet	ZMN/R20	green	ZMN/G50		
red	ZMN/R50	black	ZMN/N50		
STANDARD Colour Range HD (high opacity) According to colour card STANDARD HD for screen printing inks Availability of further standard HD shades upon request e					
white, highly opaque	ZMN 60/HD-NT	black, highly opaque	ZMN 65/92-NT		
white, highly opaque	ZMN 60/154-NT	black, highly opaque, PAH-free	ZMN 68/HD-NT		
4 COLOUR PROCESS INKS (CMYK) According to colour card STANDARD 2 or YN/ZMN/ZM for screen printing inks					
process yellow	ZMN 180/NT-NEU	process black	ZMN 65/NT		
process magenta	ZMN 181/NT-NEU	transparent paste	ZMN/TP		
process cyan	ZMN 182/NT-NEU				
AB – BRONZE INKS and MG – METAL GLOSS INKS According to Bronze Colour Card					
AB Bronze Inks			MG Metal Gloss Inks		
Upon request			Upon request		

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

All above information refers to the colour shades listed in this product data sheet and other standard shades of this screen ink range. Information about availability of further standard 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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