

Product Data Sheet

Screen Printing Ink

ZM

Solvent Based Screen Ink Range, 2-Component

APPLICATION

Screen printing inks for printing on metals (aluminium, steel, copper), coated surfaces as well as various thermoplastics such as ABS, PMMA ("acrylic glass"), pre-treated polyolefines, i.e. polypropylene (PP), polyethylene (HD-PE, LD-PE) and duroplastics (phenolic and melamine resins, glass fibre reinforced polyester and epoxy resins).

PROPERTIES

- Screen inks ZM are solvent based 2-component screen printing inks, which have to be processed with hardener.
- ZM inks show good printability. They dry chemically-physically and result in a glossy finish.
- ZM colour shade formulations are free of silicone.
- This ink range is especially suitable for technical/industrial applications requiring high physical resistances.
- Cured prints show good elasticity as well as resistance against alkaline media.
- Resistance against organic solvents is limited.
- ZM inks are also 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

- 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 ZM 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 screen printing inks ZM are suitable for long-term outdoor applications.

ADJUSTMENT FOR SCREEN PRINTING

- Screen printing inks ZM are not supplied in a ready-to-print adjustment.
- As this ink range is a 2-component system ZM 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). Depending on type of hardener, pot life is between 3 and 6 hours/20°C.

Hardener:

Screen printing inks ZM have to be mixed with hardener Z/H or ZH/N at a specified ratio (depending on properties of the colour shade).

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

Hardener ZH/N is also suitable for outdoor applications.

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

Colour Shades:	Examples:	Ink : Parts	Hardener: Parts
Medium opacity	Colour ranges Standard / Bronze colours	8	1
High opacity	Colour shades white 60, 60/HD	10	1
Transparent	ZM 70, ZM/TP, Process colours	6	1

Note: Due to the very high pigment content highly opaque colours may have a slightly reduced resistance.

Pot life:

- Ink mixed with hardener may only be processed within a limited period of time (=pot life)
- **Pot life of ZM inks**
with hardener Z/H is approx. 3 – 4 h (at 20°C)
with hardener ZH/N approx. 5 – 6 h (at 20°C)
 Higher temperatures (both hardeners) 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 % by weight 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 ZM, the following products are available:

Thinner:	○ VD 40	Quick, very high solving power
	■ VD 60	Standard thinner (mild odour)
Retarder:	■ VZ 25	Medium retarder
	■ VZ 40	Very slow retarder
■ = Preferred ○ = Suitable		

Note: Retarders VZ 10, VZ 20 and VZ 30 are not suitable for ZM 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.

ADDITIONAL AUXILIARY AGENTS

Application	Product	Addition in % by weight	Additional Information
Retarder paste	ZM/VP	Max. 10%	Possibly slightly reduced gloss
	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 3	1 - 5%	Do not overdose!

OVERPRINTING

Generally, it is not necessary to overprint ZM inks with varnish. However, overprinting to increase resistances of ink layers is possible with ZM 70.

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 ZM/B prior to processing.

Mixing ratios in parts by weight:

Gold bronze paste/powder to ZM/B = 1 : 4 - 5

Silver bronze paste to ZM/B = 1 : 5 -6

Bronzes B 75 to B 79 are prone to oxidation (exception B 78-POWDER). Therefore, they should be overprinted, e.g. with ZM 70. 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 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

Mixture of ZM 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 at least 20°C when using 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. Therefore, during air drying the temperature should not be lower than the required minimum of 15°C (Z/H) or 20°C (ZH/N). In addition, avoid high humidity. Higher temperatures will significantly speed up the cross linkage reaction.

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
	>8 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 ZM 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.*

*After oven curing allow a cooling time of at least 1 h (to room temperature 20°C).

SCREEN FABRIC / STENCILS

ZM 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.

PACK SIZE

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

SHELF LIFE

In closed original containers, ZM 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. 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: www.coates.de, Service & Support, Technical Articles

FOR COLOUR RANGES, PLEASE REFER TO NEXT PAGE.

COLOUR SHADES

STANDARD Colour Range (medium opacity) According to colour card STANDARD 2 or YN/ZM/ZM for screen printing inks Availability of further standard shades upon request					
citric yellow	ZM 10/NT-NEU	carmine red	ZM 22/NT-NEU	violet	ZM 37/NT-NEU
medium yellow	ZM 11/NT-NEU	pink	ZM 25/NT-NEU	light green	ZM 40/NT-NEU
dark yellow	ZM 12/NT-NEU	light blue	ZM 30/NT-NEU	fir green	ZM 41/NT-NEU
orange	ZM 15/NT-NEU	medium blue	ZM 31/NT-NEU	light brown	ZM 50/NT-NEU
ochre yellow	ZM 17/NT-NEU	ultra marine	ZM 32/NT-NEU	dark brown	ZM 51/NT-NEU
light red	ZM 20/NT-NEU	dark blue	ZM 33/NT-NEU	white	ZM 60/NT-NEU
bright red	ZM 21/NT-NEU	turquoise	ZM 34/NT-NEU	black	ZM 65/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	ZM 60/HD-NT-NEU		black, highly opaque	ZM 65/HD-NT	
SPECIAL PRODUCTS: Special Colour Shades, Varnishes, Pastes Information about availability upon request					
black, matt	ZM 65/MT-NT		bronze binder	ZB	
transparent paste	ZM/TP		overprint varnish	ZM 70	
matt paste	ZM/MP		overprint varnish, matt	ZM 70/MT	
retarder paste	ZM/VP				
4 COLOUR PROCESS INKS (CMYK) According to colour card STANDARD 2 or YN/Z/ZM for screen printing inks					
Upon request					
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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