Product Data Sheet
Screen Printing Ink

SunChemical®
Coates Screen Inks

AUXILIARY AGENTS & ADDITIVES (HM) FOR SOLVENT BASED SCREEN PRINTING INKS

INTRODUCTION
Generally, screen printing inks are not supplied in a ready-to-print adjustment. They have to be adjusted to specific local conditions by addition of organic solvents (thinners/retarders) and if relevant hardener prior to printing.

In some rare cases, addition of further auxiliary agents/additives may be required.

This product data sheet contains information about the following auxiliary agents/additives:

I. ADJUSTMENT OF VISCOSITY: • THINNERS • RETARDERS • RETARDER PASTES • THICKENING POWDER	**II. SURFACE & FLOW PROPERTIES:** • MATTING POWDER • FLOW AGENTS • ANTI FLOATING AGENTS • ANTISTATIC AGENTS • PLASTICIZERS (ELASTIFYING AGENTS) • ADDITIVES TO INCREASE ABRASION RESISTANCE
III. HARDENERS	**IV. ADHESION PROMOTERS**
V. CLEANING AGENTS	

GENERAL INFORMATION ABOUT THE USE OF THESE AUXILIARY AGENTS:

Always refer to the product data sheet of the individual ink ranges about the correct use and addition of the relevant additives listed below.

All information about amounts/addition are given in % by weight!

To adjust processing viscosity of an ink with thinners and if necessary retarders, possible additions mostly range from 10 to 30%. The amount added will also have an influence on the colour shade (brightness, transparency). Hence, it is essential to keep addition at a constant level.

All other auxiliary agents and additives may only be added in low quantities. Any over-dosage may result in unfavourable effects. Recommended addition amounts refer to the individual products. Always start with a low dosage and determine the most effective addition for your application by carrying out pre-trials under local conditions. Also, carry out pre-tests to confirm that the addition of auxiliary agents/additives has no unfavourable influence on the other processing and post-processing properties and the final qualities of the products produced.

☑ Information about especially environmentally and user-friendly auxiliary agents
All printing ink ranges of Coates Screen Inks meet the requirements of REACH, RoHS and EuPIA. For special applications, printers and end customers may require screen printings inks that are free of certain substances, mainly for reasons of product safety or because of own company specifications. At present our ink range ZMN generally meets such requirements. In these cases, the required auxiliary agents and additives also must be free of the solvents cyclohexanone, butyl glycolate (GB-Ester), aromatics and Solvent Naphtha. **In the following product data sheet, additives, which do not contain these substances, are marked with symbol ☑. These additives have to be used in order to meet such special requirements.**

I. ADJUSTMENT OF VISCOSITY:

To adjust viscosity of solvent based screen inks the following additives can be used:

- **Thinner:** Solvents with medium to quick evaporation rate
- **Retarder:** Solvents with slow evaporation rate
- **Retarder Paste:** Paste containing slowly evaporating solvent
- **Thickening Powder:** Light, powdery substance used to "thicken" screen inks.

THINNER:

- Evaporation rate of thinners ranges from medium to very fast.
- Addition to the inks depends on local printing conditions. Generally, addition varies from 10 – 30%, if necessary also in combination with a retarder.
- **In many cases, thinners VD50 and VD60 are suitable.**

Thinners below are listed from quick evaporating thinners to thinners with a slow evaporation rate.

HG/VSP Extremely quick thinner, for spray applications of ink range HG.
ZVSP Extremely quick thinner, for spray applications of 2-component screen inks, such as Z, Z/GL, ZM.

VD 10 ☑ Mild, low solving power. Very quick evaporation.
Also used as mild solvent to wash off misprints.

VD 20 Very quick thinner, good solving power.
Preferred for processing with high printing speeds.

VD 30 Very quick thinner, good solving power.

VD 40 Quick evaporation, "aggressive" thinner with strong solving power.
Not recommended when printing substrates highly sensitive to solvents (e.g. PS, PET-G).

VD 50 Good solving power, medium evaporation rate.

VD 60 ☑ **Universal thinner, good solving power, medium evaporation rate.**
- Standard thinner for most 1- and 2-component inks applied at medium printing speeds.
- Can be used in combination with e.g. VD 50 or VD 20 to make the ink "quicker" or "slower" e.g. with VZ 25 or VZ 40.

XVH ☑ Standard thinner for mild ink range XL.
Also optional mild thinner for ink ranges HG, CX, CP as well as Z/GL.

The above mentioned products are universal thinners for our solvent based screen ink ranges. Please also refer to the table on next page.

For some ink ranges we also offer specific thinners:

Thinner	Used for ink range	Thinner	Used for ink range	Thinner	Used for ink range
AV and AD	A	CXV	CX	MVH and MVS	M
CPV	CP	JVH	J	SKVH	SK

RETARDERS:

Retarders have a slow to very slow evaporation rate. They are added to the printing ink if screen openness is insufficient using only thinner.
Often retarders are only additionally added to the printing ink in combination with thinner.
Depending on type and amount of retarder added, drying times of the inks may be much or sometimes even significantly longer.

Retarders are listed from quick evaporating retarders to retarders with a slow evaporation rate.

VZ 05 High solving power, medium retardation.
Suitable mainly for ink ranges J, TZ.

VZ 10 Good solving power, medium retardation.
Suitable for our 1-component ink ranges.
Not recommended for 2-component inks mixed with the following hardeners:
Z/H, ZH/12, ZH/N, ZH/N-00.

VZ 20 Good retardation, medium solving power.
Suitable for our 1-component ink ranges.
Not recommended for 2-component inks mixed with the following hardeners:
Z/H, ZH/12, ZH/N, ZH/N-00.

VZ 25 **Good retardation and good solving power. Universal retarder.**

VZ 30 Relatively low solving power, strong retardation.
Recommended addition approx. 3 – 5 %.
Not recommended for 2-component inks mixed with the following hardeners:
Z/H, ZH/12, ZH/N, ZH/N-00.

VZ 35 ☑ Slow retarder. Good solving power.

VZ 40 ☑ **Strong retardation, good solving power.**
Recommended addition approx. 3 - 10 %. Universal retarder.

Overview: Thinners and Retarders. Main Properties:

Product		Evaporation	Factor*	Solving Power	Application
VD 10	☑	very quick	0,12	mild	All 1-comp. inks and Z/GL
VD 20		quick	0,2	strong	universal
VD 30		quick	0,22	strong	universal
VD 40		quick	0,25	very strong	universal
VD 50		**medium**	**0,6**	**medium**	**universal**
VD 60	☑	**medium**	**1**	**medium**	**universal**
VZ 05		medium	1,15	strong	J, TZ
XVH	☑	medium	2	mild	1-comp. inks and Z/GL
VZ 10		medium	2,3	medium	1-comp. inks and Z/GL
VZ 20		slow	5	medium	1-comp. inks and Z/GL
VZ 25		**slow**	**5**	**medium**	**universal**
VZ 30		extremely slow	9	low - medium	1-comp. inks and Z/GL
VZ 35	☑	slow	5	**medium**	universal
VZ 40	☑	**very slow**	**7**	**medium**	**universal**

*= Evaporation rate always in relation to VD 60 with factor 1.
☑ = Product does not contain aromatics, cyclohexanone, butyl glycolate (GB Ester), Solvent Naphtha.

RETARDER PASTES:

Liquid retarders reduce the viscosity of screen printing inks. If printers want to avoid/limit this effect for technical reasons a retarder paste can be used (alternatively or better mixed with the liquid retarder). Addition of retarder paste will brighten the colour shade to some extent. However, it cannot be used as transparent paste. To brighten colours (or make them more transparent) use transparent paste or varnish E50 of the relevant ink range.

LAB-N 111420/VP

Gel like thixotropic universal retarder paste with a slightly olive green tint (has no influence on colour shade).

Effect: Retarding effect, no reduction of viscosity.
Addition: 5 - 10%.
Application: Suitable for all our screen printing ink ranges.

VP/K

Thixotropic retarder paste, high solving power, slightly whitish transparent colour.

Effect: Retarding effect, no reduction of viscosity.
Addition: 5 -10%.
Application: Suitable for ink ranges: CX, CP, SG, PK, PK-JET, RF/K.
After corresponding trials also for: HG, J (possible incompatibility of binders).
Note: Not recommended for prints on plastic materials sensitive to tension cracks (injection moulds).

Z/VP and Z/VP-GL

Thixotropic retarder paste, slightly whitish transparent colour.

Effect: Retarding effect, no reduction of viscosity.
Addition: 5 -10%.
Application: Z/VP: Suitable for ink range Z
Z/VP-GL: Suitable for ink range Z/GL.

VISCOSITY INCREASE:

THICKENING POWDER

Very light, whitish powder.

Effect: Increase of viscosity/thixotropy of screen printing inks.
Improves reproduction of details of line and process prints if required.
Application: Stir into screen printing inks.
Addition: Up to 3%.
Note: Thickening powder has to be mixed (dispersed) into the ink using a suitable mixer, dissolver or shaker. If not mixed properly printing ink film may have a rough, dull and matt finish.

II. CHANGE OF SURFACE AND FLOW PROPERTIES:

MATTING POWDER

Very light, whitish powder.

Effect: Reduction of gloss level (matting) of glossy screen printing inks.
The required degree of matting (also depending on ink type) will be achieved by different amounts of addition.
Application: Stir into screen printing inks.
Addition: Up to 6%.
Note: Matting powder has to be mixed (dispersed) into the ink using a suitable mixer, dissolver or shaker. If not mixed properly printing ink film may have a rough surface with changing degrees of gloss.
Check if matted printing ink film still meets the necessary requirements.
Drying times of inks mixed with matting powder may be longer.

FLOW AGENT:

Because of the great variety of screen printing substrates and their different surface properties, you may sometimes experience problems like bubbles, pinholes, orange peel and similar effects showing in the printed film. To avoid/reduce such undesired effects special additives, so-called flow agents can be added to the screen printing ink.
Note: Handle flow agents with care! Do not exceed maximum addition. If more than the maximum amount is added flow properties may become worse and the excess flow agent will form a smudgy film on the surface of the ink film.

Flow agents VM 1 or VM 11 and VM 2 or VM 21 contain silicone and cannot or hardly be overprinted with other inks or varnishes.
To obtain a homogeneous dispersion in the ink, flow additives added should be stirred well using a suitable mixer, dissolver or shaker.

VM 1 AND **☑ VM 11**
Clear liquid, active substance (silicone) in a solvent mixture.
Effect: Improvement of flow properties.
Application: Stir into solvent based screen printing inks.
Addition: 1 - 5%.

VM 2 AND **☑ VM 21**
Clear liquid (VM 2) or slightly milky liquid (VM 21), active substance (silicone) the same as in VM1, but highly concentrated!
Effect: Improvement of flow properties.
Application: Stir into screen printing inks. After addition of VM 2 and VM 21 inks cannot be overprinted.
Addition: 0.3 – 0.5%.

VM 3 AND **☑ VM 31**
Clear liquid, active substance in a solvent mixture.
Effect: Improvement of flow properties.
Application: Stir into solvent based screen printing inks. Preferred for ink ranges ZM and Z/GL.
Use for other ink ranges only if prints will be overprinted with varnish.
Addition: 1 - 5%.

ANTI FLOATING AGENTS:

All colour shades of one ink range can be mixed in any ratio.
When mixing colour shades, mostly blue, violet or black with white at a certain ratio, a rejection reaction initiated by certain physical properties may occur. This reaction will show by floating of white pigments on the surface of the ink. In some rare cases, this problem then also shows in the printed film. This can be improved/avoided with the addition of anti floating agents.

LAB-N 561248
Clear, slightly brownish fluid. Contains silicone.
Effect: Suppression of pigment floating effects.
Application: Stir into solvent based screen printing inks.
Addition: 1 – 1.5%.

LAB-N 561969
Clear, slightly cloudy fluid. Free of silicone.
Effect: Suppression of pigment floating effects.
Application: Stir into solvent based screen printing inks.
Addition: 1 - 2%.

Generally, LAB-N 561248 is the first choice. Use of LAB-N 561969 is recommended if the required improvement could not be achieved using LAB-N 561248.

ANTISTATIC AGENT:

Static electricity may cause many problems when printing plastic materials. In screen applications static electricity may cause nonuniform ink deposit, spotty or cloudy print images, splashes (cob webbing/spider threads). In addition substrate may stick to the bottom of the stencil. Sometimes you will also have problems feeding or stacking the print sheets.
To avoid or reduce this static charge printers have following possibilities:

- Sufficient humidity (< 60 % RH) in the print room.
- Ionisation equipment to achieve sufficient conductivity of material surfaces and environment.
- Use of antistatic agents in the inks.

The following Wiecostat products are available to increase conductivity:

Application:	**Stir into solvent based screen printing inks.**	
Product:	**Wiecostat-15**	
	Clear liquid. Antistatic agent in solvent.	
Addition:	**3 bis 5%**	
Application:	**Treatment of substrate surface**	
Product:	**Wiecostat W**	**Wiecostat A**
	Clear liquid. Antistatic agent in aqueous solution.	Clear liquid. Antistatic agent in alcohol solution.
Application:	Wiping, immersion or spraying	Wiping or immersion
Addition:	Undiluted or diluted with water up to a ratio of 1 : 20	Undiluted
Notes:		Highly flammable alcohol solution!
	Read safety data sheet prior to processing!	

PLASTIFICATION/ELASTIFICATION:

A higher elasticity of the screen printed ink film than that achieved with the originally supplied ink may be required for special applications. Addition of plasticizer may further improve the elasticity of the printed ink film.

Product:	**W 1**	**W 2-AM**
	Clear liquids, free of phthalates	
Application:	Elasticity increase of 1-component screen printing inks.	
Addition:	3 - 5%	
Notes:	Standard product, universal application	Low migration, low volatility
	Plasticizers (elastifying agents) will cause longer drying times and may reduce stacking stability.	

INCREASE OF ABRASION RESISTANCE:

Certain applications require a very high mechanical resistance (abrasion) of the screen prints. In some individual cases an additive to further enhance the abrasion resistance is required. Because of the variety of influencing factors, the most suitable additives need to be identified by carrying out pre-trials.

LAB-N 560469

Fine, whitish powder, micronized wax based on PTFE.
Effect: Increase of abrasion resistance by additional stabilisation of the printed ink layer.
Application: Mix into screen printing inks effectively with stirrer/mixer.
Addition: 1 - 3%.
Note: Over-dosage will cause a significant reduction of gloss of the printed ink layer.

III. HARDENERS:

- Hardeners are the „second component“ of 2-component ink systems (2-comp. inks). In a chemical reaction hardeners cross-link with the binding agents of the relevant ink ranges.
- Ink mixed with hardener, however, can only be processed for a limited period of time (= pot-life). Pot life varies depending on ink range. Ink mixed with hardener should not be processed longer than the recommended pot life, even if ink still seems liquid and processable.
- Complete chemical reaction of ink and hardener require a minimum reaction temperature.
- Hardeners are sensitive to humidity. Therefore, containers always have to be tightly closed.

☑ ZH Reaction temperature: >15°C.
Standard for: Z, YN, PO
Suitable for: TZ, ZE 1690, ZM
Note: Not recommended for outdoor applications. Tends to yellowing.

☑ ZH/N Reaction temperature: >20°C.
Standard for: Z/PVC, TZ, ZMN, ZE 1690, Z/DD
Note: Also suitable for outdoor applications (does not tend to yellowing).

ZH/N-00 Reaction temperature: >20°C.
Standard for: ZM
Possible for: PO
Note: Also suitable for outdoor applications (does not tend to yellowing).

Ink range Z/GL: 3 Hardeners, Reaction temperature for all 3 types >20°C.

ZH/GL **Standard hardener**
Especially for air drying. Possible for oven drying (up to 140°C/30 minutes).
Prints exhibit good water resistance, but slightly limited solvent resistance.

ZH/02-GL Especially for oven drying (up to 140°C/30 minutes).
Prints exhibit good water resistance and very good solvent resistance.
Tends to yellowing, therefore not recommended for light and bronze colours.

ZH/03-GL For air drying (>20°C) and oven drying 140°C/20-30 minutes.
Prints exhibit very good water and solvent resistance.
Preferred for metal/chromium surfaces.

TP 219/L Reaction temperature: 160°C/15 minutes.
Standard for: TP 253/L (special silicone ink)

IV. ADHESION PROMOTER

PP/111925
Active substance, dissolved in solvent.
Application: Primer for polypropylene (PP) substrates.
Alternative to flame, corona or plasma pre-treatment.
Possibly also suitable for other plastics and metals.
Pre-tests to confirm efficiency are absolutely essential.
Application: As shortly as possible before printing.
Only effective if applied very thin by wiping, dipping or coating.
Dries quite quickly (air supply/exhaust system necessary)
Materials can be printed immediately after primer has dried.

V. CLEANING AGENTS:

Screen Opener Screen Spray
Aerosol spray, contains highly volatile screen cleaners (solvent mixture).

Effect:	Solving of dried ink residues.
Application:	Spray on stencils for intermediate cleaning during machine stops. Preferred for solvent based 1-component screen printing inks (e.g. HG, CP, CX etc.). With 2-component systems such as Z, ZM cleaning effect can be limited.
Dosage:	Spray onto printing stencil as required after removing ink from stencil with blade. Make some trial prints until printed image is printed completely again.
Note:	Screen Spray contains extremely flammable solvents/gases and is free of CFC. Read safety data sheets prior to processing!

Universal Cleaning Agents URS AND URS 3
Clear fluids. Solvent mixtures.

Effect:	Solving of dried ink residues.
Application:	Wiping off ink residues from stencils and tools using cleaning rags saturated with URS or URS 3. Suitable for cleaning of solvent based and UV-curing screen printing inks.
Dosage:	Undiluted.
Note:	Only use wearing appropriate personal protective equipment (PPE) such as solvent resistant protective gloves, glasses and clothing. Read material data sheets prior to processing!

Additional information:

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

Brochures:	Solvent Based Screen Printing Inks
Product data sheets:	Product data sheets of our Screen Printing Ink series
Internet:	Various technical articles are available for download on www.coates.de, section “SN-Online”

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