



Coates Screen

# Product Data Sheet



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## ADDITIVES FOR SCREEN PRINTING HM

### INTRODUCTION

Solvent based screen printing inks are generally delivered in a consistency which - apart from thinner addition - does not require any further additives for trouble-free processing.

As the screen printing process varies depending on the materials to be printed on and the process itself, in some cases it cannot be avoided to modify screen printing inks slightly in order to adapt them to the specific local printing conditions.

Coates Screen Inks GmbH, Nuremberg, offers a number of auxiliary agents. The most important information about these additives is given in this product data sheet.

### ADJUSTMENT OF PROCESSING VISCOSITY

Apart from very few exceptions solvent based screen printing inks are not delivered in a ready-to-print adjustment.

Addition of specific solvents (thinners, retarders) will allow optimal adjustment of these inks under processing conditions. These various additives have different evaporation rates and dissolving powers.

### THINNERS (VD)

Thinners are liquid additives containing medium- to highly evaporating solvents. Inks used for printing of large motives and most line motives, mainly on quick running machines are generally adjusted with thinners.

Coates Screen Inks GmbH has combined and re-named the complete thinner program in 2006. Generally the following thinners are now available (**regarding their use in the different ink types please refer to the relevant product data sheets**).

#### VD 10

Mild, low dissolving power, especially suitable for materials sensitive to tension cracks, very quick evaporation.

#### VD 20

Very quick evaporation, high dissolving power.

#### VD 30

Very quick evaporation, high dissolving power

#### VD 40

High dissolving power, quick evaporation.

#### VD 50

Good dissolving power, medium evaporation rate.

#### VD 60

Good dissolving power, medium evaporation rate. Suitable as universal thinner for many 1- and 2-component ink systems.

## **RETARDERS**

Retarders are auxiliary agents that prevent quick drying in the mesh. They reduce the evaporation rate of the solvents contained in the screen ink and also show good solving properties concerning the binding agents of the screen ink.

There will be a long screen stability even when printing speeds are low or when printing very fine motives.

Retarding agents not only delay drying of the ink in the screen. They also retard drying on the substrate. If any solvents are retained in the dried ink film, there is the risk of blocking and sticking when stacking the prints. Therefore retarders must be measured carefully. Drying tests are also recommended.

### **Liquid Retarders (VZ)**

Product names of our retarder program where also changed mid of 2006.

The following products are now available (**regarding their use in the different ink types please refer to the relevant product data sheets**).

#### **Retarder VZ 05**

Retarder VZ 05 has good solving properties and medium retardation.

#### **Retarder VZ 10**

Retarder VZ 10 has good solving properties and medium retardation. Depending on the required degree of retardation and drying possibilities recommended addition to the screen ink is approx. 5-10%.

Retarder VZ 10 is not recommended for 2-component inks mixed with isocyanate hardeners such as ZH, ZH/N, ZH/N-00.

#### **Retarder VZ 20**

Retarder VZ 20 shows good retardation properties and medium solving properties against the binding agents contained in the inks. Recommended addition to the screen printing ink is approx. 5%.

Retarder VZ 20 is not recommended for 2-component inks mixed with isocyanate hardeners such as ZH, ZH/N, ZH/N-00.

#### **Retarder VZ 25**

Retarder VZ 25 has a very good retardation and solving properties and is especially recommended for use in 2-component inks mixed with isocyanate hardeners such as ZH, ZH/N or ZH/N-00. Recommended addition is approx. 5%.

#### **Retarder VZ 30**

Compared to VZ 10 and VZ 20 retarder VZ 30 shows minor solving properties and has a strong retarding effect. Recommended addition is approx. 3-5%.

If much more VZ 30 is added drying could be highly retarded. Due to its low solving property it is sometimes difficult to mix retarder VZ 30 into the ink. In such cases addition of a small amount of VZ 10 will help.

Retarder VZ 30 is not recommended for 2-component inks mixed with isocyanate hardeners such as ZH, ZH/N, ZH/N-00.

#### **Retarder VZ 40**

Retarder VZ 40 shows strong retardation properties and good solving properties. This results in very good screen stability but also in slow curing of the screen printing ink film. Recommended addition of retarder VZ 40 is approx. 3-5%. Just like VZ 25 retarder VZ 40 can be used for 2-component inks.

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## **RETARDER PASTES**

As liquid retarders often also reduce viscosity of screen printing inks it is often suitable to use retarder pastes. These are transparent and do not change the ink shade significantly (slight brightening effect). They hardly have any effect on the viscosity.

Retarder pastes cannot be used as transparent paste to brighten the colour of a printing ink. Addition of retarder pastes should not exceed the amount indicated.

### **Retarder Paste VPK**

Retarder Paste VPK has mainly been developed for RFK process inks. In addition it is suitable for ink types CX, CP, SG, PK and PK-Jet. Tests are essential for use in HG and J inks. Used for the latter high addition of VPK will cause incompatibility of the binding agent system.

Addition is approx. 5-10%. Except for the ink ranges mentioned above retarder paste VPK cannot be used for paper inks and other inks or our program.

Due to the strong solubility of the solvents contained in VPK this product should not be used when printing onto injection moulded plastics (risk of tension cracks).

### **Retarder Paste LAB-N 111420/VP**

Contrary to the liquid retarders retarder paste LAB-N 111420/VP does not thin the ink, but still shows a retarding effect. LAB-N 111420/VP is miscible with all solvent-based ink systems. We recommend an addition of 5-10%.

## **FLOW AGENTS**

Problems that can occur on the surface of a screen printing ink film are bubbles, pinholes, orange peel or similar effects. In order to avoid such undesired effects in some cases certain auxiliary agents, so-called flow agents, have to be added to the screen ink.

Addition should be carried out carefully and the amount specified should not be exceeded.

Proceed with caution when overprinting inks mixed with silicone containing flow agents. This especially applies to thick ink layers as resulting from roller or spray coating. The varnish could shrink, form bubbles or show bad adhesion.

In any case, it is very important to stir the flow agent into the ink intensively in order to achieve a homogeneous dispersion.

### **Flow Agent VM1**

Silicone containing flow agent for a broad field of applications. It is suitable for all ink types except water based inks.

Eliminates flow problems in the screen ink film such as orange peel, bubbles, pinholes and similar effects.

Addition approx. 1-5%, not overprintable.

### **Flow Agent VM2**

Effect of flow agent VM2 is basically the same as VM1. This additive is more concentrated and therefore more effective.

Flow agent VM2 is applicable if use of VM1 was not satisfactory.

Addition should not exceed 0,3-0,5%. Only in exceptional cases up to 2% VM2 can be added to the screen printing ink.

In reference to use and limited overprintability refer to the information given for VM1.

### **Flow Agent VM3**

It is only suitable to use flow agent VM3 if no other silicone containing flow agents (VM1 or VM2) have already been mixed into the ink.

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Flow agent VM3 is preferably used for overprinting applications (e.g. for ink type ZM for long-term outdoor use). This flow agent has shown excellent results as additive for 2-component inks Z/GL and Z. VM3 can also be used for all other screen printing ink types except water dilutable screen printing inks.

Addition approx. 1-5%. A higher dosage is not suitable and will not achieve any improvement.

#### **ANTI-FLOATING AGENT LAB-N 561248**

Floating of varnishes and screen printing inks mainly occurs with mixed colours containing white. This affects mainly mixtures of white with blue or partly also white with violet. Here the white pigments swim to the surface of the ink which finally results in considerable colour shade deviations during printing. The colour becomes dirtier and brighter. With addition of liquid anti-floating agent LAB-N 561248 this effect can be suppressed to a great extent or even eliminated. An addition of 1 to maximum 1.5% is sufficient.

#### **ELASTIFYING AGENT OR PLASTICIZER**

Increased elasticity is sometimes necessary for special applications (e.g. thermo-forming or cutting of plastic or metal sheets).

Another example is the cracking of highly opaque screen printing inks on glossy substrates. In such cases addition of elastifying agent or plasticizers will help.

Elastifying agent or plasticizers have to be added carefully. Over dosage will make the ink film too soft and the prints tend to stick and block. Pre-tests are always essential.

##### **Plasticizer W1**

Plasticizer W1 is used to improve elasticity of screen printing ink films.

This plasticizer is especially used in air drying inks (CX, CP, SG) in order to avoid edge curl of screen prints on self-adhesive foils.

Addition is 3-5%. Over dosage of plasticizer W1 will cause an increased risk of sticking and blocking on the prints.

#### **THICKENING POWDER**

Thickening powder is used to adjust screen inks to be more thixotropic. Sometimes this will be necessary, especially when printing fine details, characters, halftone lines etc.

The thickening powder is a very light, powdery substance. Addition to the screen printing ink is approx. 2-3%. Generally sufficient thixotropy and thickening is achieved by adding this amount.

A good dispersion of the thickening powder in the ink is important. We recommend using a suitable agitator, like a high-speed mixer.

If dispersion of the thickening powder is insufficient the printing ink film will have a rough, cloudy and mat surface. The rough particles could also clog up the screen mesh.

#### **MATTING POWDER**

The matting powder looks like thickening powder. However, it is used to mat screen inks and not to increase thixotropy. Depending on the amount added the gloss of the printing ink film is changed and the viscosity is increased.

Depending on the required degree of gloss addition of approx. 3-6% is possible.

In order to achieve good dispersion of this powder in the screen ink a suitable agitator should be used.

It is not always possible to mat inks which are drying by oxidation, 2-component inks or UV-curing inks with this matting powder. If ink viscosity allows, higher addition is required in those cases.

Using matting powder tests have to be carried out in order to determine whether the printing ink film corresponds to further requirements.

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### **DRYING AGENT A/ST-00**

Drying agent A/ST-00 is a combination of dry substrates (siccative) used to improve drying and curing of inks drying by oxidation. It can only be used for oxidation drying inks (type A). Drying agent A/ST-00 cannot be used as catalyst for air-drying, UV-curing or water dilutable screen printing inks.

Upon delivery oxidation drying inks do contain driers. However, during longer storage periods a part of these driers is absorbed by the pigments and therefore useless for the drying process.

In this case addition of approx. 1-3% dryer A/ST-00 is recommended. There is no advantage using a higher dosage. A higher dosage might even affect drying properties.

### **HARDENERS OH AND OSH**

The hardeners OH and OSH can only be used for oven curing screen printing inks (type O). They are not suitable for any other ink types of our program.

#### **Hardener OSH**

Hardener OSH is used to reduce curing temperatures or curing time of oven curing screen printing inks. It is possible to reduce stoving temperatures from 140°C (284°F) without changing stoving time and achieve optimal curing of the printing ink film at the same time.

Addition of hardener OSH is approx. 3-5%. Addition of hardener OSH will reduce storage life of the ink.

#### **Hardener OH**

Hardener OH can also be used for oven curing screen printing inks only. It is used to increase hardness and gloss of the screen printing inks film. Addition of hardener OH will make the ink film more brittle and less elastic.

Addition is approx. 5-10%.

### **ADHESION PROMOTER PP/111925**

Adhesion Promoter PP/111925 is an adhesive ground, especially developed for polypropylene. If adhesion promoter PP/111925 is used, pre-treatment like flame or corona treatment is unnecessary. Pretests are required for other plastics and metals.

Adhesion Promoter PP/111925 may be applied by spraying, dipping or brushing. However the layer applied should be thin, as otherwise adhesion promoter PP/111925 will lose its efficiency.

Substrates treated with adhesive agent PP/111925 may be coated, printed, glued or metallized one minute after application or after a few months.

### **SCREEN OPENER SCREEN SPRAY**

In order to achieve fast printing speeds, quick drying inks are required for the fast running printing machines used in the modern printing shops today. Apart from UV-curing inks, the necessary high printing speeds can only be achieved using air drying ink systems based on thermoplastic resins and solvents with a fast evaporation rate.

During interruption and breaks, there is the risk of the ink drying in the screen mesh, especially during high temperature periods in summer. If the binding agents of the ink are based on air drying synthetic resins the ink film may be dissolved using solvents similar to those contained in the liquid screen printing ink; i.e. drying of such an ink type is reversible. The efficiency of the so-called „Screen Openers“ is based on this.

If suitable solvents, like those contained in „Screen Spray“ are applied, the printing inks dried into the screen mesh will be solved spontaneously.

For longer interruptions the screen should be squeegeed and sprayed with „Screen Spray“. Then the screen mesh will remain open. After the break, the screen will be open again after printing a few sheets.

If the ink dries during printing it is sufficient to spray the screen shortly with „Screen Spray“.

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„Screen Spray“ can mainly be used for air drying inks. Although oxidation drying inks and also 2-component ink types will be solved during short printing breaks there is the risk that these inks cure irreversibly during longer breaks and cannot be solved any more.

This especially applies if the washed screens stand for longer periods after printing.

Screen opener „Screen Spray“ is a liquid solvent mixture filled in spray cans. Of course the propellants used are not the ozone killers FCKW (chlorinated fluor hydrocarbons).

„Screen Spray“ contains a propellant non-hazardous to the environment. This propellant is flammable. Therefore the cans are marked with the flame symbol „extremely flammable“.

### **ANTISTATIC AGENTS**

Static electricity is often a big problem when printing onto plastics. Static electricity shows in form of irregular ink deposit, dulling, spraying of the ink, sticking of the substrate (foil on stencil) or other problems occurring during laying and stacking of the prints.

The cause of static electricity is the separation of surfaces, during which charge separation occurs. The surplus of positive and negative charge on the surface cannot flow off the non-conductors (plastic) or the isolated conductors and remain as static or resting electricity.

Static charge can be eliminated most efficiently with high humidity (60%), as this will reduce surface resistance. Another possibility would be the use of antistatic agents.

Coates Screen Inks GmbH offers 4 different types of antistatic agents.

#### **Wicostat W**

Wicostat W is an aqueous solution of an antistatic agent. It is mainly used to make floors conductive and to treat substrates sensitive to tension cracks and solvents.

In order to apply the antistatic coating three methods are possible:

1. Wiping with a soaked cloth or spreading with a brush
2. Dipping the material into the antistatic solution.
3. Spraying the material using a spray gun.

In many cases cleaning and de-electrification can be done in one step by adding Wicostat ratio 1:20 to the cleaning water.

It is possible to wash small amounts of plastic boards (e.g. acrylic glass) with a thinned solution of Wicostat W. This way the surface of the material will become conductive and printing will be trouble-free.

Lubricants or plasticizers coming from cover or protection foils are removed as well.

However, adhesion of the screen printing ink film is affected if the antistatic film on the substrate is too thick.

It is also possible to treat small plastic parts by immersing them into a bath with thinned antistatic solution.

#### **Wicostat A**

Wicostat A contains the same active substances as Wicostat W. As Wicostat A is an alcoholic solution it dries faster than watery solutions. As Wicostat A is flammable the usual safety precaution have to be considered during work.

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### **Wiecostat-Spray**

The active substances of Wiecostat-Spray correspond to those contained in Wiecostat W or Wiecostat A. This antistatic agent is delivered in spray form with a high concentration. This spray is also free of FCKW.

### **Wiecostat N**

Wiecostat N contains a special antistatic agent, which is mainly used to increase conductivity of a screen printing ink. Wiecostat is also solved in an organic solvent. Addition of approx. 1-3% to the screen ink will often eliminate printing problems caused by static charge. Drying properties of the ink will change if this amount is exceeded.

All above-mentioned antistatic agents cannot only be used for screen printing. Wiecostat may also be useful for other problems caused by static charge. This applies to industrial and household use, e.g.:

1. To fight dust attraction.
2. To renew antistatic cloths.
3. To avoid problems in pneumatic dispatch equipment made of PVC pipes.
4. To avoid sparks during the production and processing of plastics.
5. To impregnate textiles, carpets etc.
6. To secure continuous processing in the graphic industry

There are many applications for Wiecostat products. However, Wiecostat does not offer an unlimited protection against static charge. If the materials are not washed protection usually lasts one year.

### **GENERAL**

Which additive to use depends on individual circumstances. In certain situations it is suitable to use auxiliary agents. However, just like medicine an overdose may have adverse effects. Therefore pre-tests should be carried out under the local conditions in order to determine the most favourable addition amount within the values stated above.

The information given in this product data sheet can only be understood as non-obligatory advice for the elimination of certain problems occurring during printing.

### **CLASSIFICATION**

Read material safety data sheet prior to processing.

The material safety data sheet according to Regulation (EC) No. 1907/2006 (REACH) contains classification according to Regulation (EC) No. 1272/2008 (CLP/GHS) as well as instructions for precautions when processing, handling and storing as well as first aid.

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*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. They serve to advise our business associates, but it is absolutely necessary to make your own printing tests under local conditions, with regard to the intended purpose prior to starting the job. - All former product data sheets are no longer valid. MAY 2015 – VERSION No. 8*

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