

## UV-auxiliary agents program

# SERIES 500

**Liquid, high concentrated auxiliary agents for a senseful modification of UV-screen printing inks. In special, individual cases is a subsequent optimizing of ink properties with these universal additives possible.**

Each batch of Printcolor Screen Ltd UV-curable ink line is delivered in a specific developed and checked quality range. In some cases it's necessary to work with a recommended hardener system (f.e. Series 540 UV-GL plus hardener Serie 500-GL, see technical leaflet).

Under normal (!) printing conditions all screen printing inks are working well and the demanded results can be obtained without problems. A supplementary addition of auxiliary agents is mostly not necessary and in usually not senseful. Explanation: The whole spectrum of offered additives (exception: hardener) is included in all ink formulations and a higher dosage is for normal applications not necessary and often not helpful. Generally the principle "much does not help much" applies. In many cases overaddition will cause a turnabout of the required effects.

*So why the supply of a whole extra auxiliary agents program? The additives are to help the printer to obtain the best printing solutions if unfavorable substrates, environmental influences (heat or humidity) or other print problems are encountered. Here is a technically complete and user friendly range of additives to help the printer solving these problems.*

*The addition of auxiliary agents is an important step and must be realized with a balance or a scaled vessel. Often a overdosage finishing in undesired and not reversible problems; f.e. flow agents shows in case of overdosage a turnabout with flow and wetting troubles. Ideal to prepare an ink with auxiliary agents is to work with a mixing system and stir well. An addition of more than 10 weight-% of additive to ink must be realized step by step because in some cases there's a risk of flocculation, gelling or other undesired reciprocal actions.*

### The 'thinner' Series 500-017

This special low viscous agent is developed for all UV-curable screen printing inks and is specific formulated for the printing conditions of technical use. This agent is solvent free and has only the function of a normal thinner, namely the reduction of the viscosity. Series 500-017 is a liquid acrylate (monomer) with low viscosity and will crosslinked in the ink layer completely by UV-polymerization.

The normal addition amount of this reactive material in UV-inks is app. 10 % by weight and influences parallel to the viscosity(reduction) also the reactivity (increasing). Mostly an improvement of chemical and mechanical resistances is recognizable. Overdosage will cause deterioration of all product properties, mainly loss of reactivity and sticky surface.

The thinner Series 500-017 is a reactive, sensitizing material with high skin irritating potential, higher than all UV-screen printing inks. Avoid direct contact with eyes

and the skin; contamination's of skin and/or eyes must be cleaned immediately with plenty of warm water and soap, clothes must be changed and cleaned.

### The accelerator Series 500-019

This is a specific mixture of different initiators for transparent, light and white pigmented UV-inks. Series 500-019 is free of monomers and solvents but very sensitive against sun light and other UV-light containing sources. The included raw materials increases the reactivity without any changement of color. The addition amount of this yellowing-free initiator cocktail is normally 1-3% by weight, max. 5 weight-%. In comple

tion to curing speed this agent improve the chemical and abrasion resistances.

Overdosage may cause overcuring, which may result in overprintability problems or other difficulties during further processing (embossing, scoring, folding).

### The accelerator Series 500-020

This mixture of high efficient initiators is also free of monomers and solvents. It's created for pigmented systems without white and light blues and grays (yellowing effects). This initiator blend is more reactive than the yellowing-free system Series 500-019; all other informations are equal to the technical informations of Series 500-019.

Both initiator mixtures shows a concentration of 100% and have a extremely effective potential. Use this auxiliary agents only in necessary situations and handle both with care. The activity of this initiator cocktails are near the visual wavelengths with high sensibility in the UV-A range. In all cases direct sun light and all UV-emission sources must be impossible. Initiators are the active parts of UV-inks and the starting particles for the chain reaction of UV-polymerization.

**Apart from thinner, initiators and hardener Printcolor Screen Ltd offers other additives in a concentrated form. So to speak these high efficient agents are the 'spice' of an ink; using too much of these gives an unpalatable product so additions have to be carefully measured to give solutions to print problems.**

*To improve the chemical resistances and in case of glass applications to increase the water resistance of UV-curable screen printing inks it's possible to work with a hardener. Parallel to the UV-polymerization we've a chemical crosslinking process between groups of UV-raw materials and the hardener. So a pot life with limited working time results. But: In contrast to the classic two-component screen printing inks is the pot life longer 24 hours (always in relation to temperature, addition and humidity). Hardeners should be carefully added at the correct percentage. Fault relation between ink and hardener can lead to instability affecting adhesion, chemical and outside resistances, brittleness of ink film and loose of gloss values. Hardeners should be completely mixed in the ink before addition of other additives; The hardener-modified ink should be 'rested' for 15 minutes before printing to obtain optimum results like flow and wetting. A reduction of pot life is given by high humidity (> 70%) and temperatures (> 30°C). There's also a self reaction of hardener with humidity, so tins containing the hardener must be wiped of spillage and properly sealed after use to avoid the hardeners going off. The amount of hardener is very specific and should be checked up to the technical leaflets.*

#### **The hardener Series 500-GL**

This highly reactive hardener built on aliphatic components combines the characteristics of UV-inks with the resistances of 2-component inks. This system is for long term outside use, yellowing-free and initiate very high chemical resistances of polymerized ink layers. This hardener is the most modern one in isocyanate basic and being solvent free is user- and environmental-friendly. Addition of right amounts of hardener shows only minimized decrease of reactivity. Improvement of water resistances on glass gives special the combination Series 500-GL with ink line Series 540 UV-GL. Also the modification of Series 520 on injection moulded acrylics to get absolute humidity and alkaline resistances is often successful. The amount added should be 3-5 % by weight with a maximum of 10% and thoroughly mixed into the UV-inks. An over-dosage reduce the curing speed, decrease the adhesion and overprintability.

#### **The adhesion promoter Series 10-73850**

This special agent is helpful, if the adhesion on difficult materials is not perfect. In addition of 1-3 % by weight, max. 5 weight-%, the spectrum of printable materials will be wider, special in combination with Series 560 or Series 562. Mostly it's used on polystyrene and it's modifications ABS, SAN, etc. and also on different coatings.

The adhesion promoter decrease a little bit the reactivity and chemical resistance of the modified ink, but shows no negative influence to stock-life. Have a discussion with the technical staff at Printcolor Screen Ltd before use.

#### **The flow agent Series 500-VMS**

This highly concentrated silicon additive assists flow and improves in some cases the gloss level of the ink and avoids foaming. Typical problems like bubbling, pinhole and orange-peel effect will also be eliminated by target use of this auxiliary agent. The addition of Series 500-VMS change the ink tension and in this connection the wetting properties; this influence improves sometimes the adhesion to the printed substrates.

The additive should be added at 0,3-0,5% and 1% by weight to a max and thoroughly mixed into the inks. Overdosage causes lubricants on the surface of the print and sometimes a deterioration of adhesion is also possible. May cause cloudiness in clear systems and care should be taken with interlayer adhesion.

The addition of Series 500-VMS can give wetting problems by further strange applications like spraying, rollercoating or casting.

#### **The wetting agent Series 500-BMS**

Flow and adhesion problems can be caused by substrate contamination's and pollution's. These can be bits on extruded plastics, silicone contamination's of release papers, oxidation's on glass and metals, additives of protection foils on the substrate surface, etc. To get a good wetting and adhesion on this materials, it's possible to modify the UV-inks with Series 500-BMS. This additive reduce the ink-tension on the substrate surface and allow the correct print on this extreme materials.

This high concentrated, liquid additive should be added at 0,5-3% to a max and thoroughly mixed into the inks. Primary the adhesion of UV-inks is in relation to the substrate surface. These must be clean to realize the promised properties of polymerized inks layer. So in case of wetting problems the look and opinion of material surface must be the first step; secondary is the chemical modification of UV-ink with additive, f.e. Series 500-BMS.

#### **The antistatic-agent Series 500-AMS**

Static charge normally builds up when printing plastics and is seen in uneven ink deposit, splashing of applied ink film (spider webs) bad ink transfer from mesh to substrate and others. Mostly this effect is observed on plastics; background is that in screen printing process a lot of plastics are collectors of energy, follow from sheer stress in process. This energy can't flow off and discharge by contact of different plastics. Collectors of this energy are the squeegee (polyurethane), the emulsion or capillar film (polymerized acrylate), the fabric (polyester), the UV-ink (unpolymerized acrylate) and the printed material. Special the water and solvent free UV-inks are qualified for this effect and containing normally enough antistatic additives in the ink-formulation. An other initiator for static problems are humidity (< 60%) and temperature (> 30°C). To alleviate this problems an addition of antistatic agent Series 500-AMS is helpful. The addition amount is around 0,5-1 weight-%, max 2 % by weight.

Parallel to the modification of inks, there's the possibility to work with an antistatic-spray. This additive, Static-Go, reduces the surface tension of spray-treated plastic surface and minimize on this way the formation of unliked static effects.

*All the aforementioned additives give the printer a very efficient and senseful assortment to the hand. In case of printing problems the user can find practical solutions for most troubles, but it's advisable to test small amounts before going into production; naturally the technical staff of Printcolor Screen Ltd will always be available for discussions and to solve the problems.*

*In addition to the 'spice'-additives Printcolor Screen Ltd offers two different high effective cleaners for UV-application. The main properties of both cleaners are the very low hazardous potential and the opportunity to use in solvent re-circulating equipment. The solvent mixtures are developed for cleaning process in the printing area and for all used utensils.*

#### **The universal useable cleaner Series 500-URS**

This solvent mixture is specially formulated for easy cleaning down of UV-inks and contains no film causing chemicals or greases and so after evaporation leaves no residues. It's free of acid or alkaline materials, contains no chlorinated or fluorinated components and is not regarded as poisonous according to present health and safety legislation. The flash point is higher than 21 °C. All hazardous, environmental and transport values are pointed out in the material safety data sheet.

#### **The biodegradable cleaner Series 500-BRS**

This is a mixture of solvents according to present laws on dangerous substances does not have to be marked as hazardous, but it's a high effective cleaner for all UV-curable screen printing inks. The evaporation rate is lower than Series 500-URS, so the need of time for a dry surface is longer and can speed up through extraction and temperature. With the biodegradable cleaner Series 500-BRS is an ecologically and physiologically practical alternative to the usual (not always safe) cleaning agents on the market available. It's well suited to the needs of UV-screen printing.

*It's important not to use the cleaning agents for skin and cloth cleaning. To do this is quick and in the first moment effective, but the aggressive and drying properties of cleaners can have an adverse effect on the skin and body. Through the solving characteristics, also to the skin, it's possible that UV-raw materials can penetrate in form of solvent transportation in deep skin layers and shows there the full potential of irritation.*

*Also Printcolor Screen Ltd offers suitable cleaning products for daily skin hygiene; if interested we'll be glad to supply more informations.*

#### **Precautionary measures**

Read material safety data sheet prior to processing.

The material safety data sheets according to OSHA form contain indication of hazardous ingredients, TLV-level and instructions for precautions when processing, handling and storing as well as first aid. The information given in the MSDS refers to processing as described in this technical leaflet. The statements in our leaflets have been made to the best of our knowledge and are given without any obligation. 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 printing job. In case of any doubts please contact our technical advisors. The application, use and processing of the products delivered by us are beyond our control. This is subject to your responsibility and there is no liability or guarantee on our part. In case of justified complaints the manufacturer can only be made liable for the countervalue of the used ink system.

Addition of not mentioned products or competitors products are on your own risk and releases Printcolor Screen Ltd. of any later demands, especially in cases of damage and loss caused by alien products.

All former leaflets are no longer valid.

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