

## Technical leaflet

## Auxiliary agents program for 2-component inks

# SERIES 600

## Universal useable additives 2-component screen printing inks

**Liquid, high concentrated auxiliary agents for a senseful modification of all 2-component 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 2-component screen printing ink line is delivered in a specific developed and checked quality range. Only the thinners, retarders and hardeners must be added for correct usability. 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 (not thinner, retarder and hardener) is mostly not necessary and is 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 over-dosage 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 (f.e. solvent shock), gelling or other undesired reciprocal actions.*

### **The thinner Series 600-017**

This special thinner has been developed for universal use in all Printcolor Screen Ltd 2-component screen printing inks. The mixture of different solvents has been formulated to allow for stoppages of production with minimum drying in whilst still maintaining good drying speeds. This thinner is suitable for both applications, hand and machinery printing. The normal addition amount of this universal useable system is app. 10-20 % by weight and will ensure good rheology and drying conditions of the inks and make it ideal for all inline applications. This mixture of solvents is favorable to long run work as it is specially formulated to have a low evaporation in screen and fast drying on the printed substrate. Overdosage will cause deterioration of all product properties, mainly reduction of drying speed and decreasing of opaque ink layer development with smooth surfaces.

### **The retarder Series 600-018**

This is a specific mixture of different solvents with higher evaporation rate. This retarder will help if slower drying of the ink is required and printing is sporadic or problems are experienced with ink drying in the screen. A maximum addition of 10% by weight is recommended and it's best to combine with a standard thinner (f.e. Series 600-017 or special thinner Series 10-0330) to achieve the correct printing consistency. This mixture of solvents is favorable to long run work as it is specially formulated to have a low chemical attack to the emulsion/capillar film surface ensuring longer printability.

Over-dosage will cause deterioration of all product properties, mainly reduction of drying speed and decreasing of opaque ink layer development with smooth surfaces and also a reduced crosslinking of hardener and ink resins.

### **The accelerator Series 600-019**

This mixture of high efficient solvents with low evaporation values has been specifically developed for quick drying on the substrate and is famous for cylinder press processes and also for roll-to-roll machines. Similar to the thinner Series 600-017 this fast thinner should be added at 10-20 % by weight for optimum results. Mixtures of other thinners and this Series 600-019 fast thinner are also desirable to achieve best printing results.

### **Spraying thinners Series 600-377**

Screen printing inks can be used for spray coating by reducing their viscosity with special spraying solvent Serie 600-377. An addition of 30-40% should be sufficient and 50% should be the maximum. Because of the high ratio of solvent needed they should be added gradually to avoid solvent shock or ink separation and an addition of 1-2% of wetting additive Serie 600-BMS is recommended.

### **Paintbrush thinner Series 600-743**

In addition to spraying screen inks can also be applied by brush or roller using special solvent Serie 600-743 at about 25-35%. Depending on the substrate the flow of the ink can be enhanced by addition of 1-3% of wetting additive Serie 600-BMS.

### **The special retarder Series 10-02637**

This is a specific mixture of extremely long solvents with high evaporation rate. This long retarder is developed for a higher temperature production climate and promise a very long and good openness under strong conditions. But also there's a slow evaporation at the printed substrates. So it's possible that a blocking problem under normal conditions will be occur. That's the reason why the maximum addition of this retarder is only 10 weight-%; in some cases of higher thinning necessary and only to realize with a mixture of retarder Series 10-02637 with other solvents or thinners. This mixture of solvents is favorable to long run work as it is specially formulated to have a long openness of the screen image. The ingredients are without problems to environment and printing persons.

### **The special thinner Series 10-0330**

This is a special mixture of thinners to improve the adhesion to polystyrene materials and it's modifications like ABS, SAN, etc., but also to PET and the copolymerised plastics like PET-A, PET-E or PET-G. The drying and thinning characteristics are equal to a normal thinner, also the addition amounts of 10-20 % by weight. Take care on injection moulded plastics; here's the danger of cracking and brittleness of plastic materials. In some cases a combination with other thinners or retarders is successful. The thinner Series 10-0330 has to this special plastics a function like an adhesion promoter, so the use is in all 2-component screen printing lines possible to increase the adhesion on special polystyrene and its modifications.

*To improve the chemical resistances and in case of glass applications to increase the water resistance of 2-screen printing inks it's necessary to work with a hardener. Parallel to the physical process of solvent evaporation we've a chemical crosslinking process between main or side-groups of resin materials and the hardener. So a pot life with limited working time results. 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, also thinners. 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 off 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 600-HDA**

This highly reactive hardener built on aliphatic components combines the characteristics of high chemical resistances and extremely good abrasion resistances. The hardener Series 600-HDA is for long term outside use, yellowing-free and initiate very high flexibility of crosslinked ink layers in relation to used resin system. This hardener benefits from a good gloss finish, elongation and stretchability due to its lack of brittleness.

The amount added is explained in the technical data sheets of each ink line. In comparison to the aromatic system Series 600-HDI this hardener has a longer pot life (in relation to humidity and temperature, also in proportion of reactivity of resin materials of modified screen printing ink), but needs also a longer curing time for the crosslinking process. An overdosage reduce the curing speed, decrease the adhesion and chemical and/or abrasion resistances. Best partners for an addition are the screen printing ink lines Series 640, Series 644, Series 650, Series 658, Series 660 and Series 665.

### **The hardener Series 600-HDI**

This highly reactive hardener system is developed for internal use for industrial and technical applications. The main properties are extremely high chemical and mechanical resistances and fast crosslinking under normal conditions. Because of its chemical composition, it's an aromatic based isocyanate material, it tends to yellowing and chalking in exterior conditions. The high reactivity allows for quick curing and is therefore ideal where fast printing processes or further processing of the prints item are required. The recommended crosslinking temperature is 20°C or higher.

Because of the high chemical potential of this hardener system it's important that any residue is removed from the edges of the container and the lid firmly replaced, especially in areas of high humidity and/or temperatures. There's a self-reaction with water (water in the air = humidity). An overdosage reduce the curing speed, decrease the adhesion and chemical and/or abrasion resistances.

Best partners for an addition are the 2-component screen printing ink lines Series 630, Series 650 and sometimes Series 640.

### **The hardener Series 600-HDR**

The highly reactive hardener built on aliphatic components combines the characteristics of the above systems Series 600-HDA and Series 600-HDI. This hardener is the most modern one, because it's a solvent-free product. The environmental and health and safety demands are well combined with high quality technical characteristics. This 100 % product is developed for long-term outside use without loose of brilliance and gloss; also there's no yellowing or chalking effect recognizable. A very high

gloss development in combination with good flexibility and fast curing properties makes this product unique. The minimal disadvantage of this hardener system is the required crosslinking temperature of minimal 23°C, better higher. This hardener is a perfect system for oven curing processes (140-160°C / 20-30 min).

An overdosage reduce the curing speed, decrease the adhesion and chemical and/or abrasion resistances.

Best partners for an addition are the 2-component screen printing ink lines Series 640, Series 644, Series 658, Series 660, Series 665 and sometimes Series 630 or Series 650.

### **The hardener Series 600-GL**

This specific hardener was developed for incorporation into epoxy based inks like Series 630, giving excellent adhesion and resistances when printing on glass or ceramics. This solvent free system shows a highly reactivity by minimized addition amounts of app. 5% by weight to the epoxy-ink. So there's only a minimal influence to color shade or opacity of ink. The optimum cure and development of resistances is achieved by heat curing (backing) at 140-160°C for 20-30 minutes. Special on glass, silica and ceramic substrates the oven curing process guarantees a high water resistance. The combination of epoxy resins with this hardener is not for out-door useable.

*Apart from thinner, retarder, accelerator 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.*

### **The adhesion promoter Series 700-PP**

This special agent of pad printing auxiliary agent program is helpful, if the adhesion on untreated polypropylene materials is not good enough. An addition of app. 10-20 weight-% to the systems Series 630, Series 640 and Series 650 improve the development of adhesion to untreated polypropylene. The modification with this special agent stipulate no pot-life, but in some cases a reduction of chemical resistance is possible. Special polypropylene offers the opportunity to add a high quantity of recycling material in the PP-batch. Also the advantage of copolymerize polypropylene build up nearly each day new plastics under the synonym PP. So polypropylene is a very indifferent material and own trial before starting the production are always necessary. Have a discussion with the technical staff at Printcolor Screen Ltd before use.

### **The flow agent Series 600-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 600-VMS change the ink tension and in this connection the wetting properties; this influence improve 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 may cause silicon contamination, lubricants on the surface of the prints 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 600-VMS can give wetting problems by further strange applications like spraying, roller-coating or casting.

### **The wetting agent Series 600-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 screen printing inks with Series 600-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 0,5-2% to a max and thoroughly mixed into the inks. Overdosage will cause deterioration of flow and drying properties, sometimes also loose of adhesion and overprintability.

### **The antistatic-agent Series 600-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 2-component screen printing ink (different synthetic resins) and the printed material. An other initiator for static problems are humidity (< 60%) and temperature (> 30°C). To alleviate this problems an addition of antistatic agent Series 600-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 screen printing 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 like containers, frames, spatula, etc.*

### **The universal useable cleaner Series 600-URS**

This solvent mixture is specially formulated for easy cleaning down 2-component screen printing 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 600-BRS**

This is a mixture of solvents which according to present laws on dangerous substances does not have to be marked as hazardous, but it's a high effective cleaner for all 2-component screen printing inks. The evaporation rate is lower than Series 600-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 600-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 screen printing.

A special operation of this cleaner is the use as thinner in 2-component screen printing ink if printed on hot (> 80°C) material surfaces. Nearly unlimited openness of print image is combined with moderate evaporation in the screen and fast tack-free curing on the heated material.

*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 ink raw materials can penetrate in form of solvent transportation in deep skin layers and shows there the full potential of chemical activity.*

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

### **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 doubt please contact our technical advisors. The application, use and processing of the products delivered by us are beyond our control. This is subject to our responsibility and there is no liability or guarantee on our part.

All former leaflets are no longer valid.

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