Additives for Pad Printing

Liquid, high concentrated auxiliary agents for a senseful modification of all pad printing inks Group A. In special, individual cases is a subsequent optimizing of ink properties with these universal additives possible.

Each batch of Teca-Print AG pad printing ink line is delivered in a specific developed and checked quality range. Only the thinners and retarder must be added for correct usability. In some cases it's necessary to work with a recommended hardener system (see specific technical leaflet of 2-component pad printing inks). Under normal printing conditions all pad 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 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.

Shelf life

Technical data to the shelf life of various additives can be found on the container label or tube end closer. This data does not mean that the product can no longer be used. When stored properly (cool and dry = 15 .... 25°c, max. 30°c / humidity 20 ... 70%) it remains at the discretion of the operator as to whether or not the product can be used beyond the guarantee date, as often, it will continue to produce good results.
Print and adhesion tests are recommended generally in all cases.

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 (f.e. solvent shock), gelling or other undesired reciprocal actions.

Thinners/Retarders

Thinner VM

This special thinner has been developed for universal use in all Teca-Print AG pad 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 equipments, open inkwell and closed pot (cup) systems. The normal addition amount of this universal usable system is app. 10-20 % by weight and will ensure good rheology and drying conditions of the inks and make it ideal for wet-to-wet and multicolor printing. This mixture of solvents is favorable to long run work as it is specially formulated to have a low chemical attack on the pad surface ensuring longer pad life. Overdosage will cause deterioration of all product properties, mainly loss of ink transfer from cliché to pad and pad to substrate.

Fast thinner VO

This mixture of high efficient solvents with low evaporation values has been specifically developed for quick drying on the substrate and is famous for rotary pad printing processes and also for closed pot (cup) machines. Similar to the thinner VM this fast thinner should be added at 10-20 % by weight for optimum results. Mixtures of other thinners and this VO fast thinner are also desirable to achieve best printing results.

The special thinner VP

This is a special mixture of thinners to improve the adhesion to polystyrene materials and its modifications like ABS, SAN, etc., but also to PET and the copolymerisated 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 mate-

rial. In some cases a combination with other thinners or retarders is successful. The thinner VP has to this special plastics a function like an adhesion promoter, so the use is in all pad printing lines possible to improve the adhesion on special polystyrene and its modifications.

The special retarder ZM

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 pad and a minimizing of shrinking. So it's possible that a transfer problem from pad to substrate will be occur. That's the reason why the maximum addition of retarder is only 10 weight-%; in some cases of higher thinning necessary and only to realize with a mixture of retarder ZM with other solvents or thinners. The evaporation level of this mixture is also developed for blow-drying of pad. This mixture of solvents is favorable to long run work as it is specially formulated to have a low chemical attack on the pad surface ensuring longer pad life. The ingredients are without problems to environment and persons.

Retarder ZU

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 on the pad. A maximum addition of 10% by weight is recommended and it's best to combine with a standard thinner (f.e. VM or special thinner VP) to achieve the correct printing consistency. Under this given in most cases the need for blow-drying is not necessary. This mixture of solvents is favorable to long run work as it is specially formulated to have a low chemical attack on the pad surface ensuring longer pad life. Overdosage may cause transfer problems from pad to substrate and also a reduced crosslinking of hardener and ink resins.

Hardeners

To improve the chemical resistances and in case of glass applications to increase the water resistance of 2- component pad printing inks, its possible 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 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.

Hardener HA

This highly reactive hardener built on aliphatic components combines the characteristics of high chemical resistances and extremely good abra-sion resistances. The hardener HA 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 HM this hardener has a longer pot life (in relation to humidity and temperature, also in propertion of reactivity of resin materials of modified pad 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 pad printing ink lines TPC 528, TPC 538, TPC 548 and TPC 558.

Hardener HM

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

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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 pad printing ink lines TPC 508, TPC 528 and sometimes TPC 128.

Hardener HB

The highly reactive hardener built on aliphatic components combines the characteristics of the above systems HA and HM. 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 pad printing ink lines TPC 528, TPC 538, TPC 548, TPC 558 and sometimes TPC 118.

Hardener HV

This specific hardener was developed for incorporation into epoxy based inks like TPC 508, 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 usable.

Additives

Apart from thinner, retarder, accelerator and hardener, Teca-Print AG 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.

Abrasion Additive AE

The Abrasion Additive AE is an additive used in the pad printing process for the purpose of increasing wear and scratch resistance. The resistance properties (e.g. mechanical abrasion) of the ink coating are dramatically increased through the addition of this paste. This unique paste is universally utilized and is added in concentrations of 10-30% (weight percentage). Drying is possible in room temperature, jet, or oven.

The adhesion promoter PP

This special agent is helpful, if the adhesion on untreated polypropylene materials is not good enough. An addition of app. 10-20 weight-% to the systems TPC 118, TPC 128, TPC 528 and TPC 538 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 Teca-Print AG before use.

Flow agent MV

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 MV 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 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 MV can give wetting problems by further strange applications like spraying, rollercoating or casting.

Antistatic additive AS

Static charge normally builds up when printing plastics and is seen in uneven ink deposit, splashing of applicated ink film (spider webs) bad ink transfer from pad to substrate and others. Also in addition to bad ink transfer the 'feathering' of edge print is recognized; this is often worse when using polymer plates. Mostly this effect is observed on plastics; background is that in pad 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 pad (silicone), the polymer plate (polymerized acrylate), the pad printing ink (solution of plastic resins in solvents) 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 AS 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 minimizes on this way the formation of unlinked 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 Teca-Print AG will always be available for discussions and to solve the problems.

Cleaners

In addition to pure additives, Teca-Print AG also manufacture 2 effective cleaners for washing down plates, tools and other items. Both are suitable for use in solvent re-circulating tanks.

Cleaner RM

This solvent mixture is specially formulated for easy cleaning down of 1- and 2-component pad 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.

Cleaner RB

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 1- and 2-component pad printing inks. The evaporation rate is lower than cleaner RM, so the need of time for a dry surface is longer and can speed up through extraction and temperature. With the biodegradable cleaner RB 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 pad printing.
A special operation of this cleaner is the use as thinner in 2-component pad printing ink if printed on hot (> 80°C) material surfaces. Nearly unlimited openness of plate image is combined with moderate evaporation on the pad 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 Teca-Print AG offers suitable cleaning products for daily skin hygiene; if interested we'll be glad to supply more information.

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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