



# Technical Data Sheet Additives for Pad Printing Inks

## - Universal Additives for Pad Printing Inks Group B

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## Additives for pad printing

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

Pad printing inks of Teca-Print AG have been developed for world-wide use in various pad printing systems. Due to the diversity of the pad printing process, it is impossible to deliver such inks in ready-to-print adjustments. Therefore use of various additives to adjust the pad printing inks to the different environmental conditions and printing requirements is necessary. Properties and application of the most important additives for pad printing will be described in the following.

The addition of auxiliary agents is an important step and must be realized with a balance or a scaled vessel. Often an overdose finishing in undesired and not reversible problems; e.g. flow agents shows in case of overdose 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 (e.g. solvent shock), gelling or other undesired reciprocal actions.

### 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.

## THINNERS / RETARDERS

**Thinners** are used to adjust the ink to a ready-to-print consistency. Amount of thinner used depends on ink type, printing speed, environmental conditions, plate depth and the like.

**Retarders** are slowly evaporating thinners used for slow printing speeds or for printing of fine details (process printing). It is often better to add retarder to the universal retarder instead of using it alone.

The evaporation rate of a thinner or retarder in the mixed ink also depends on the solving power of the individual ink types. Thinners with a high solubility will be retained for a longer period than thinners with a low solubility.

The higher the amount of the solvent addition the longer the period of time until it evaporates and the ink physically dries.

The following summary indicates the relative evaporation rates in relation to thinner VD.

**Summary Thinners And Retarders By Evaporation Rate**

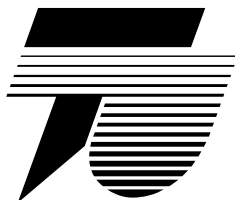
<u>Thinner</u>	<u>f</u>	<u>Evaporation rate</u>
Thinner VT	0.25	fast / Jet-thinner
Thinner VV	0.3	fast / Jet-thinner
Thinner VS	0.5	quickly
Thinner VX	0.6	quickly
Thinner VC	1	standard
<b>Thinner VD</b>	<b>1</b>	<b>standard</b>
Thinner VN	1	standard
Thinner VW	1,75	standard
Retarder ZW	4,75	moderate retard.
Thinner VG	5	moderate retard.
Retarder ZD	12	moderate retard.
Retarder ZE	25	slowly

Example: Thinner VG evaporates 5 times slower than Thinner VD, Thinner VS as twice quicker than VD. This example is intended to be a rough guideline.

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### Thinner VD

Universal thinner for pad printing inks. Due to its balanced mixture of solvents, thinner VD is the first choice for all "regular" pad printing applications.

Thinner VD is suitable for all pad printing inks of the ink-group B, with the exception of TPC 301.

### Thinner VS

This universal thinner is suitable for quicker printing speeds. Like thinner VD, VS is suitable for all our pad printing ink types, with the exception of TPC 301. But especially for TPC 250.

### Thinner VT

Extremely quick thinner allowing processing of pad inks on very quick running printing machines.

Thinner VT is also suitable for all our pad printing inks, with the exception of TPC 301.

### Thinner VV

An extremely fast thinner which together with the TPC 301 enables printing at very high speeds.

The cyclohexanone- and aromatic-less VV Thinner shows good solvent power and is effective for supporting adhesion.

### Thinner VW

This aromatic- and cyclohexanone-less solvent mixture with an excellent solvent power makes the VW Thinner the number one choice for the "easy to use" TPC 301. This thinner has a strong soluble effect on specific thermoplastics.

### Thinner VX

Mild special thinner for sensitive substrate. In combination with ink type TPC 320 thinner VX is especially suitable for printing onto plastics with a tendency to tension cracks (e.g. Polystyrene form parts).

Thinner VX is **not suitable for 2-component pad printing inks** (except TPC 250).

In addition, thinner VX may also be used as mild **cleaning agents for faulty prints**.

### Thinner VN

Thinner VN is an "aggressive" thinner, which may improve adhesion of pad printing inks on soluble substrates. There will be no improvement of adhesion on non-soluble plastics (e.g. Polyolefines, PE, PP).

Thinner VN is suitable for all Teca-Print pad printing inks, with the exception of TPC 301.

### Thinner VG

This thinner is suitable for slower printing speeds. Also being an universal thinner VG is suitable for all pad printing inks of our range, with the exception of TPC 301.

### Retarder ZD

Retarder ZD shows a very high solubility and medium retardation. Added to thinners ZD is especially suitable for printing of fine details (process prints).

ZD is suitable for all our pad printing inks, with the exception of TPC 301.

### Retarder ZG

Universal retarder ZG shows high solubility and a strong retarding effect.

ZG is suitable for all our pad printing inks, with the exception of TPC 301.

### Retarder ZE

(no storekeeping)

Retarder ZE shows low solubility and strong retardation. Just like thinner VX it can be used for printing onto plastics with a tendency to tension cracks in combination with ink type TPC 320 (without hardener). **This retarder is not suitable for 2-component inks** (except TPC 250).

### Retarder ZW

The retarder ZW offers a good solvent power along with a moderate retarding effect. It is effective for supporting adhesion, is both free from aromatic compounds and cyclohexanone, and belongs to the TPC 301 ink system. ZW supports the printing of fine details in process printing.

### Retarder paste PV

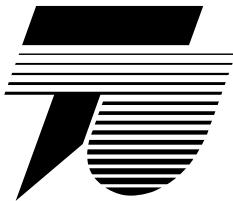
Contrary to the liquid retarders, retarder paste PV does not thin the ink, but still shows a retardation effect.

Retarder paste PV is miscible with all ink systems, with the exception of TPC 301.

We recommend an addition of 5 ... 10%.

## HARDENERS

*Hardeners react chemically with suitable ink systems. This reaction is initiated as soon as the hardener is mixed with the ink. Therefore 2-component systems consisting of ink and hardener,*



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ink can only be used for a limited period of time (pot life).

Even if the mixed ink still seems to be processable after this time it should be substituted by new ink in order to guarantee adhesion and resistance values to correspond to the requirements.

Reaction of ink with hardener can take up to 6 days. Even though the ink film seems to be dry a short time after evaporation of solvents (physical drying) the chemical cross linking process still continues. This chemical reaction requires the minimum temperatures as described in the following.

### Chart : Hardener and his Properties

Har- de - ner ↵	Prozessing		Properties / Resistance			
	Room- temp. minim. °C	Curing possible at max. °C	chem. Resis- tance	mech. Resis- tance	Water- Resis- tance	UV- resis- tance
<b>HG</b>	> 20	yes / 140	+++	++	-	minimal
<b>HH</b>	> 20	air- drying	+	+	+++	minimal
<b>HI</b>	> 20	yes / 80	+++	++	+++	minimal
<b>HN</b>	> 10	yes / 140	++	++	-	minimal
<b>HP</b>	> 15	yes / 140	++	++	-	minimal
<b>HR</b>	> 20	yes / 140	++	++	-	<b>yes</b>
<b>HW</b>	> 15	yes / 140	++	++	-	<b>yes</b>

Resistance values should not be checked prior to termination of the cross linking process (see data sheets of the individual ink types).

The hardener containers should always be tightly closed, as hardeners tend to react with humidity and become unusable.

### Hardener HG

Cross linking component for ink range TPC 250. Air and oven curing; prints show very good chemical resistance, especially if cured at higher temperatures.

### Hardener HH

Cross linking component for ink range TPC 250. Suitable for air and oven curing. Cured prints show **good water resistance** and relatively good chemical resistance.

### Hardener HI

Cross linking component for ink range TPC 250. Air and oven curing; prints show very good chemical resistance. Cured prints show **good water resistance** and relatively good chemical resistance.

### Hardener HN

Cross linking component for ink ranges TPC 180, 200, 230, 270, 320, and TPC 360. Reacts at temperatures starting from 10°C.

Slight tendency to yellowing. Therefore, it should not be used for outdoor applications.

### Hardener HR

Cross linking component for ink range TPC 180, TPC 270, TPC 320, TPC 350 and TPC 360. Curing temperature above 20°C, **does not tend to yellow and is suitable for outdoor applications.**

### Hardener HW

The solventless cross-linking component for the TPC 301 ink series. The TPC 301 should be used together with this hardener only for two component applications. A big advantage of the HW is that it begins to react at room temperatures higher than 15°C. The hardener HW is not subject to yellowing and as a result can be used for outdoor print applications.

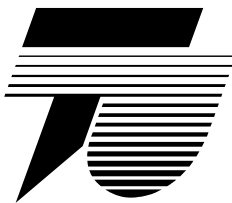
## ADDITIVS

In addition to the essential thinner, retarder and hardener, additives in concentrated form are also offered. These additives are mixed together with the ink in mostly smaller dosages. An overdosage can lead to useless results in the end. The source of the problem, therefore, should be clarified thoroughly prior to adding, in order to produce a solution systematically via an appropriate modification.

### Summary Additives

Addi- tives	Form	Addi- tion	Add Using	Over- print- able
		%		
<b>AA</b>	liquid	3 ... 5	dissolver > 10 min	yes
<b>AP</b>	pasty	5 ... 10	manuell	yes
<b>AM/AS</b>	liquid	0.5 -1.0	high-speed mixer	yes
<b>MP</b>	powder form	3 ... 5	dissolver > 10 min	yes
<b>MD</b>	pasty	---	Inline-print with Ink	yes
<b>MT</b>	liquid	---	manuell pretreatment	yes
<b>MV</b>	liquid	1 ... 5	High-speed mixer	no

Additives used to improve Abrasion Resistance no storekeeping				
<b>AB</b>	powder form	1 ... 3	dissolver > 10 min	no
<b>AC</b>	powder form	1 ... 3	dissolver > 10 min	limited
<b>AD</b>	liquid	1 ... 3	dissolver > 10 min	no



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### ADDITIVES FOR THE IMPROVEMENT OF ABRAISION RESISTANCE

#### Additiv AB

The additive AB is a powdered additive for the improvement of abrasion resistance. Amounts of 1-3% should be added while stirring with a dissolver. Larger dosages result in a considerable gloss reduction.

#### Additiv AC

The additive AC is a combination of powdered solids with which very good abrasion resistance is achieved.

The additive AC should be added in amounts of 1.0 to 3.0% while stirring with a dissolver.

There is no expected gloss reduction with dosages of 1%. Larger dosages result in a slight gloss reduction.

#### Additiv AD

The additive AD is a liquid additive with which very good abrasion resistance is achieved.

The additive AD should be added in amounts of 0.5 to 1.0% while stirring with a dissolver.

There is no expected gloss reduction with dosages of 1% max.

### FLOW AGENTS

*Problems occurring may be bubbles, pinholes, orange peel or the like on the surface of the pad printing ink film. In order to avoid such undesired effects sometimes certain additives, so-called flow agents have to be mixed into the pad printing ink.*

*However, the flow agents should be added carefully and the amounts indicated below should not be exceeded. Utmost attention is required if inks containing silicone-containing flow agents will be overprinted or laminated.*

*In any case, it is important to stir the flow agent into the ink very thoroughly in order to achieve homogenous distribution.*

#### Flow agent MV

This is a silicone-containing flow agent with a broad field of applications. It is suitable for all ink types except water based ink types. Eliminates flow problems such as orange peel, bubbles, pinholes or the like in the pad ink film.

Addition approx. 1 – 5 %, not over-printable.

### ANTI FLOATING AGENT

*Floating is an effect sometimes occurring when producing mixed colour shades. This effect e.g. often appears when mixing inks with a high degree of white with pad printing inks containing pigments with small particle size and a low specific weight (e.g. mixtures of white printing ink with blue and black).*

*During drying of the printing ink film the pigments separate resulting in irregular distribution of the colorants in form of honeycomb cells or stripes. There might also be an even floating of one pigment, so that the surface of the pad ink film shows another colour than the bottom side, especially with transparent materials.*

#### Anti Floating Agent AA

In such cases addition of approx. 3 – 5% of the anti floating agent may help.

As the cause of floating may be due to very different reasons, the pad ink manufacturer cannot basically exclude this effect.

### ANTI STATIC AGENTS

*Static charge is often quite problematic when printing onto plastics. Static charge mainly shows by splashes in the image. The static charge is mainly due to separation of surfaces resulting in separation of charge. The excessive positive or negative charge particles on the surface cannot discharge on a non-conducting material (plastic) or on an isolated conductor and will stay in for of static or closed electricity.*

*In order to avoid static charge the surface of the materials and the surrounding area have to be sufficiently conductive. Elimination of static charge is best achieved by sufficient humidity (approx. 55%) as this will reduce surface resistance. Another possibility is the use of anti static agents, offered in two different types.*

*Antistatic agents are available in liquid or pasty form.*

#### Antistatic agent AS

Anti static agents in liquid form, which can be added to all our inks in order to increase conductivity of the pad printing ink.

Addition approx. 1-2%.



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### **Antistatic Paste AP**

Antistatic paste AP is a slightly yellow, clear and gel-type paste, which can be processed well. It is suitable for all ink types of our range and is **stirred well into the un-thinned ink**.

Addition is approx. 3 ... 5% and depends on the amount of static charge.

### **MATTING POWDER**

*The matting powder has a similar appearance than the thickening powder. However, it is used to mat the pad printing inks and not to increase thixotropy. Depending on addition the degree of gloss of the printing ink film is increased, but viscosity is increased at the same time.*

### **Matting powder MP**

Depending on the requested degree of gloss addition of approx. 3 to 6 % is possible.

In order to achieve good dispersion of the powder in the ink use a suitable mixer.

**It is not always possible to mat oxidation drying inks, 2-component inks or UV-curing inks with matting powder.** If viscosity of the inks allow this, here addition would have to be a lot higher.

If using matting powder tests have to be carried out in order to determine if the matted ink film still corresponds to the other requested requirements.

### **ADHESION PROMOTER**

*Adhesion promoters are an adhesive ground, especially for polypropylene. Use of adhesive agent will eliminate the necessity of pre-treatment by flaming or corona. For other plastics or metals pre-tests are required.*

### **Adhesion Promoter MD**

The Adhesion Promoter MD serves as a primer, specifically for polypropylene. Flame or corona pre-treatment become unnecessary though the use of the adhesion promoter MD. Print trials are required for other plastics and metals. The adhesion promoter MD can be transferred in the pad printing process, unlike the adhesion promoter MT, which is described further below. We recommend the MD only for single-hit printing, since it loses its effectiveness with larger ink layer thicknesses. Printed materials can be printed with subsequent colors directly "in line/wet in wet" with the Adhesion Promoter MD.

### **Adhesion Promoter MT**

Adhesion promoter MT be applied by spraying, immersing or brushing. However, it should only be applied in thin layers, as a thick layer will be ineffective.

Substrates treated with adhesion promoter MT can be coated or printed one minute after application or even after several months.

### **GENERAL**

*Users have to decide in each individual case which additive to use. Use of additives is suitable in certain circumstances, however just like with medicines over-dosage of auxiliary agents may have an adverse effect. Therefore, the most favourable addition amount has to be determined in each case under the local circumstances.*

*Information given above is only a guideline of measurements you can take to eliminate pad printing problems. However, they are to be understood as non-binding advice only.*

### **MARKING**

Read material safety data sheets prior to processing. The material safety data sheets according to 91/155/EWG contain marking in compliance with the regulation on dangerous preparations (1999/45/eg) as well as instructions for precautions when processing, handling and storing as well as first aid.

. The information given in the material safety data sheet refers to processing as described in this product data sheet.

***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. May2009 – Version No. 7***