Product Data Sheet
Pad Printing Ink

SunChemical®
a member of the DIC group
Color & Comfort

TP 318

Solvent Based Pad Printing Ink Range, 2-Component

APPLICATION

As pad printing inks TP 318 can be processed with two different hardeners they show an exceptionally vast variety of possible applications.

Depending on hardener used TP 318 inks are suitable for the following substrates:

- With hardener TP 219/VCH:
  Glass, ceramics, duroplastics, metals. Chromium- and nickel-plated, gold-plated and rhodium-coated surfaces.
- With hardener TP 219:
  Thermoplastics, especially pre-treated polyolefines, i.e. polypropylene (PP), polyethylene (HD-PE, LD-PE), PMMA (acrylic glass), polyamide (PA), cellulose acetate, various duroplastics as well as metal and coated surfaces.

PROPERTIES

- **In line with current safety requirements pad printing inks TP 318 have been formulated with especially environmentally compatible raw materials. TP 318 inks as well as the thinners and additives required for adjustment do not contain aromatics, butyl glycolate (GB-Ester), cyclo-hexanone, and also no polycyclic aromatic hydrocarbons (PAH). The ink system meets the criteria to obtain the GS mark (category 1) according to GS specification AfPS GS 2014:01 PAH.**
- Pad inks TP 318 are solvent based pad printing inks. They are processed as 2-component ink with hardener. Depending on application and substrate two different types of hardeners are used.
- TP 318 dries physically/chemically-reactive and results in a satin gloss finish.
- The ink system shows an exceptionally easy and reliable printability and can be processed on various types of pad printing equipment.
- TP 318 inks are formulated without silicone-containing flow agents. They are therefore also suitable for applications with following application of reflective or adhesive coatings. However, due to the variety of processing conditions, pre-tests are absolutely necessary.
- Especially when processed with hardener TP 219/VCH this ink system shows an outstanding chemical resistance.
- Due to the binders (epoxy resin) TP 318 inks are not weather resistant. They are suitable for indoor and short-term outdoor applications.
- Note: Because of the variety of substrates, pre-tests are essential. It is also advised to check efficiency of possibly required pre-treatment of substrates (cleaning/degreasing, flame/corona/plasma treatment) or maybe even post-treatment (flame-drying).

COLOUR SHADES - OVERVIEW

• Mixing System:	C-MIX 2000	12 colour shades for mixing of RAL, PMS and HKS colours. In TP 318 range with especially high colour intensity. **Further information in the section "Choice of Pigments".**
• Opaque:	Standard HD	Highly opaque colour shades.
• Process Inks:	„180" colours	4 transparent colour shades according to ISO 2846-4.
• Bronzes:	MG	Gold, silver and copper shades.

- Special colour shades are available upon request.
- More information about available colour shades in the detailed tables in section Colour Shades.

CHOICE OF PIGMENTS AND LIGHT FASTNESS

Colour shades of TP 318 ink range contain pigments with a high light fastness. Light fastness and weather resistance will reduce if thinner layers are applied or if base colours are mixed with a high ratio of white or varnish.

Due to the binders (epoxy resin) TP 318 inks are not weather resistant. They are suitable for indoor and short-term outdoor applications.

- **TP 318 C-MIX 2000 colours with extra high colour density:**
  The transparent or semi-transparent C-MIX 2000 colours of TP 318 have about 50% higher pigmentation than the usual C-MIX 2000 shades.
  Therefore, very brilliant colours with a high intensity can be achieved, especially on transparent substrates such as glass or PMMA.
  If required, a mixture of 2 parts of C-MIX 2000 colour with 1 part varnish TP 318/E50 or TP 318/E50-MT (matt varnish) will result in the usual C-MIX 2000 colour density.

ADJUSTMENT FOR PAD PRINTING

- **Pad printing inks TP 318 are not supplied in a ready-to-print adjustment.**
  Note: To avoid any undesirable introduction of aromatics, butyl glycolate or cyclohexanone only use the below-mentioned thinners, retarders and additives.
- 2-component inks TP 318 have to be mixed with hardener at a specified ratio prior to processing.
- Thinner is added after addition of hardener.
- The mixed ink should be allowed to pre-react for approx. 15 minutes prior to processing (recommendation).
- Processing is then possible for a specified period of time (=pot life).

Hardener:
For TP 318 inks we offer two different types of hardener.

- **TP 219:** **Mixing Ratio Ink : Hardener = 4 : 1**
  ➔ For printing of plastics and metal surfaces.
  The cured ink is quite flexible, therefore also suitable for edge-bending of coated metal sheets.
  Resistance against chemicals and solvents is very good.

- **TP 219/VCH:** **Mixing Ratio Ink : Hardener = 10 : 1**
  ➔ Essential when printing on glass and ceramics.
  Compared to use of hardener TP 219 the cured ink film is less flexible. Very suitable for printing on metals which will not be formed after printing. Chemical resistance is excellent.

Note:

- Hardeners are sensitive to humidity. Therefore, containers always have to be tightly closed.
- Especially for TP 219/VCH humidity has to be avoided. Therefore, only small containers of TP 219/VCH should be used. TP 219/VCH is available in 100 g and 1 litre containers.
- Because of their reactive properties shelf life of hardeners is limited:
  TP 219: 14 months TP 219/VCH: 12 months.

Pot life:

- Ink mixed with hardener may only be processed within a limited period of time (=pot life).
- **Pot life of TP 318 + hardener is approx. 4-8 h (at 20°C).**
  Higher temperatures will reduce pot life.
- We do not recommend processing the inks for longer than the pot life as adhesion and resistance properties will then continually deteriorate, even if the ink still seems to be liquid and processable.

THINNERS / RETARDERS

Depending on local conditions ink is adjusted to printing consistency by addition of 15 – 35 % by weight of thinner or retarder.

Generally, the thinner suitable for TP 318 inks is Additive U!

The additional products listed below should only be used if the required printing quality cannot be achieved using additive U (e.g. drying too slow or too fast). All products listed below can be mixed into the inks individually or as mixtures.

For adjustment of pad inks TP 318, the following products are available:

Thinner:	○	Additive C	Extremely quick thinner, good solving power
	○	Additive D	Very quick thinner, good solving power
	■	**Additive U**	**Standard thinner**
	○	VD 60	Slow thinner
Retarder:	○	VZ 35	Very slow retarder
	■= Preferred	○= If required	
Note:	**For printing with thick and thin steel clichés sensitive to corrosion**		
	○	Additive U/00	Standard thinner with anti-corrosion additive
	○	Additive D/00	Quick thinner with anti-corrosion additive

Depending on printing conditions, the products listed above can be mixed into the inks individually or as mixtures. Please note that depending on evaporation rate of the thinner/retarder used drying times may be longer.
Thinner/retarder should be mixed into the ink thoroughly using a mixer or agitator. In addition, inks should be stirred well prior to each processing to obtain a homogeneous dispersion of all ingredients.

ADDITIONAL AUXILIARY AGENTS

Application	Product	Addition in % by weight	Additional Information
Viscosity increase	Thickening powder	Max. 3%	Stir with mixer
Matting	TP 318/E50-MT	10 - max. 50%	Stir well
Antistatic agent (paste)	STM-P1	Max. 10%	Possibly slightly reduced gloss
Flow agent	VM 41-SF	Max. 5%	Free of silicone

OVERPRINTING

Generally, it is not necessary to overprint TP 318 inks with varnish. However, overprinting to achieve an enhanced protection of ink layers is possible with TP 318/E50.

BRONZE COLOURS

Bronze colours 75/MG to 79/MG (metal gloss) are available.
Note: When overprinting MG metal gloss colours with varnish or other colour shades it is essential to carry out pre-tests to check intermediate adhesion of the ink layers (fingernail test, tape test).

“B” bronze pastes, “B” bronze powder and “AB” bronze colours are not available in TP 318 ink range to avoid a possible introduction of aromatics and ensure compliance of PAH threshold values (e.g. AfPS GS 2014:01 PAH).

DRYING / HARDENER REACTION

Mixture of TP 318 ink/hardener is a chemically-reactive system with a physical pre-drying.

- Ink dries physically by evaporation of solvents.
- Then the ink film cures by chemical cross-linkage reaction.
- **Drying and reaction temperature of hardener TP 219 and TP 219/VCH must always be more than 15°C!**

Drying

Drying times below are only approximate as drying properties depend on various factors:

- Type and amount of thinners/retarders used.
- Thickness of printed ink layer (single print, multi-layer print).
- Drying temperature.

Depending on local conditions, average drying time is approx. 2 – 3 minutes at room temperature (20 – 25° C). Drying time with heat application (e.g. hot air fan) and air circulation is about 30 - 60 seconds.
Complete drying may take several hours, also depending on the substrate.

Drying with NIR or K-NIR radiators (=drying with short-wave infra-red)

TP 318 inks in combination with hardener TP 219/VCH are suitable for curing with high-energy NIR or K-NIR radiators. Drying time, depending on layer thickness and colour, is only a few seconds. After cooling the dried ink film shows good resistances. Drying parameter have to be determined by pre-trials under local conditions.

Hardener Reaction

Basically, the increased resistance properties of the printed ink film are only achieved after complete drying followed by chemical cross linkage reaction between ink and hardener. This cross linkage reaction depends on time and temperature.

The following are guide values only:

Temperature	Time approx.	Condition of ink	Additional information
<15°C air drying		Hardener TP 219 or TP 219/VCH do not react!	Ink film will not achieve any resistance
20°C air drying	20 min.	"Touch-dry"	No resistance yet
	>72 h	High degree of cross-linkage	High resistances achieved
	>5 days	Hardener TP 219: Maximum degree of cross-linkage	Maximum resistances achieved
	>10 days	Hardener TP 219/VCH: Maximum degree of cross-linkage	Maximum resistances achieved
80°C oven curing	approx. 5 min.	Dry enough for overprinting	No resistance yet
	60 min.	High degree of cross-linkage	High resistance values achieved
140°C oven curing	20 min.	Maximum degree of cross-linkage	Maximum resistances achieved.

Multiple Layer Printing – Overprintability / Intermediate Adhesion

Reliable overprinting of printed ink layers is only possible for a limited period of time - 12h/20°C. Higher drying temperatures will reduce this period. Oven curing at 140°C/30 min. to speed up the cross-linking process should only take place after printing of the last ink layer.

Resistance Tests

Resistances should not be checked before the ink has fully cured/cross-linked.
After oven curing allow a cooling time of at least 30 minutes.

CLICHÉ

All commercial types of clichés (polymer, thin and thick steel, ceramic) are suitable for processing TP 318 inks.

CLEANING

The longer inks dry on clichés, pots and tools the harder will be their removal due to the chemical cross-linkage reaction. Therefore, always remove ink residues as soon as possible using our universal cleaning agents URS, URS 3 or thinner VD 40.
Note: When producing prints for end products to be evaluated for compliance with PAH threshold values (e.g. AfPS GS 2014:01 PAH) we recommend cleaning with our products additive C, U or VD 60.

PACK SIZE

Pad printing inks TP 318 are delivered in 1 litre containers. Other pack sizes are available upon request.

SHELF LIFE

In closed original containers, TP 318 inks generally have a shelf life of 3 years from date of production. Hardener TP 219/VCH has a shelf life of 12 months and TP 219 has a shelf life of 14 months from date of production, also in closed original containers.
For exact date of expiry, please refer to the label.

SAFETY DATA SHEETS

Read safety data sheet prior to processing
Safety data sheets comply with Regulation (EC) No. 1907/2006 (REACH), Appendix II.

CLASSIFICATION AND LABELLING

Hazard classification and labelling comply with Regulation (EC) No. 1272/2008 (CLP/GHS).

CONFORMITY

Coates Screen Inks GmbH does not use any of the substances or mixtures for the production of printing inks, which are banned according to the EUPIA (European Association of the Printing Inks Industry) exclusion policy. Pad printing inks range TP 318 standard shades, C-MIX 2000 colour shades, standard, highly opaque standard colours (HD), process colours, silver, fluorescent colours and transparent colours comply with the requirements of toy standard „EN 71-3:2019 Safety of toys – Migration of certain elements (category III: scraped off material).
Further compliance confirmations are available upon request.

ADDITIONAL INFORMATION ABOUT OUR PRODUCTS

Product data sheets:	Auxiliary Agents for Pad Printing HM
Brochures:	Pad Printing Inks
Internet:	Various technical articles are available for download on www.coates.de, section “SN-Online”; e.g. “Processing of 2-component Inks”

FOR COLOUR RANGES, PLEASE REFER TO NEXT PAGE.

COLOUR SHADES

C-MIX 2000 BASE COLOUR SHADES

Mixing system for matching of PMS, HKS, RAL colours (on white substrates)

C-MIX 2000 Colours of TP 318 range have a 50% higher pigmentation than the usual C-MIX shades. Mixing TP 318 C-MIX 2000 colours at a ratio of 2:1 with TP 318/E50 will result in the "usual" colour densities of the C-MIX 2000 range.

Start formulations available in data base „Formula Management C-MIX 2000"

According to colour card C-MIX 2000-P

primrose	TP 318/Y30	red	TP 318/R50	green	TP 318/G50
golden yellow	TP 318/Y50	magenta	TP 318/M50	black	TP 318/N58
orange	TP 318/O50	violet	TP 318/V50	white	TP 318/W50
scarlet	TP 318/R20	blue	TP 318/B50	varnish	TP 318/E50

STANDARD Colour Range HD (high opacity)

According to colour card STANDARD HD for pad printing inks

Availability of further standard HD shades upon request

citric yellow, highly opaque	TP 318/10-HD	carmine red, highly opaque	TP 318/22-HD
medium yellow, highly opaque	TP 318/11-HD	light blue, highly opaque	TP 318/30-HD
dark yellow, highly opaque	TP 318/12-HD	violet, highly opaque	TP 318/37-HD
orange, highly opaque	TP 318/15-HD	light green	TP 318/40-HD
light red, highly opaque	TP 318/20-HD	white, highly opaque	TP 318/60-HD
bright red, highly opaque	TP 318/21-HD	black, highly opaque	TP 318/68-HD

SPECIAL PRODUCTS: Special Colour Shades, Varnishes, Pastes

Information about availability upon request

Matt varnish, blend	TP 318/E50-MT

4 COLOUR PROCESS INKS (CMYK)

According to colour card STANDARD 2 for pad printing inks or TP 218/ TP 300 ….

process yellow	TP 318/180	process black	TP 318/N58
process magenta	TP 318/181	varnish (for brightening)	TP 318/E50
process cyan	TP 318/182		

AB – BRONZE INKS and MG – METAL GLOSS INKS

According to Bronze Colour Card

AB Bronze Inks	**MG Metal Gloss Inks**	
For technical reasons not available for TP 318 range	rich gold	TP 318/75-MG
	rich pale gold	TP 318/76-MG
	pale gold	TP 318/77-MG
	copper	TP 318/78-MG
	silver	TP 318/79-MG

Matching of PMS, RAL, NCS colours and special shades upon request.

All above information refers to the colour shades listed in this product data sheet and other standard shades of this pad printing ink range. Information about availability of further standard shades upon request.

In some individual cases the product characteristics of special colour shades and modifications of this ink type manufactured upon customer request may differ from the above properties.

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. We provide these details to inform customers about our products and their possible applications. However, on account of various factors influencing processing of our products it is absolutely essential to carry out printing trials under local production conditions. Choice of individual ink types and their suitability for the intended application is the sole and entire responsibility of the user. We do not assume any liability for any problems of technical or process-related nature. Any liability shall be limited to the value of the goods delivered by us and processed by the user.

- All former product data sheets are no longer valid. ***March 2025 - Version B8***

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