

Product Data Sheet

Pad Printing Ink

TP 313

Solvent Based Pad Printing Ink Range, 1- and (alternatively) 2-Component

APPLICATION

Pad printing ink range for printing on various thermoplastics, especially polystyrene (PS) copolymers such as ABS, SAN and polymer blends like PC/ABS. In addition, for printing on PMMA ("acrylic glass"), polycarbonate (PC), rigid PVC. As 2-component ink suitable for some polyester materials. After pre-treatment (flame-treatment) also for polyamide (PA), after pre-treatment (flame, corona, plasma) also for polypropylene (PP) and polyethylene (PE).

TP 313 inks are used for a variety of technical-industrial applications, toys and promotional articles.

PROPERTIES

- Pad inks TP 313 are solvent based pad printing inks. They can be processed as 1-component and (alternatively) as 2-component ink with hardener
- **In line with current safety requirements pad printing inks TP 313 have been formulated with especially environmentally compatible raw materials. TP 313 inks do not contain aromatics, butyl glycolate (GB-Ester), cyclohexanone, Bisphenol A (BPA) and also no polycyclic aromatic hydrocarbons (PAH).**
Exception: AB bronzes 75/AB to 79/AB (contain aromatics) and black colours N50 and 65 (PAH-containing pigments).
- **If the criteria to obtain the GS mark according to GS specification AfPS GS 2014:01 PAH have to be met, the following applies:**
Colour shade black: Only colour shades N58, 68 or 68-HD-NT are suitable.
Bronze colours: Only MG bronzes are suitable (available upon request)
Thinner/Additives Only those products marked with symbol ☑ in this data sheet are suitable.
- Processed as 1-component ink TP 313 dries physically, as 2-component ink physically chemically-reactive
- TP 313 inks dry quickly and result in a glossy finish. TP 313 inks can be processed on a variety of pad printing machines, from various flat systems to quick running rotation systems.
- Processing as 2-component ink will further increase ink adhesion properties on difficult substrates such as pre-treated PP/PE.
- This ink system shows very good abrasion resistance. This resistance can be increased further by adding abrasion additives.
- TP 313 prints exhibit good resistances against alcohol and benzines. These resistances are even better, when processed as 2-component system.
- Ink range TP 313 is suitable for outdoor applications.
- TP 313 inks are certified according to USP Medical Class VI. They can be used for printing onto medical devices
- 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.
- Opaque: Standard Colour shades with medium to good opacity.
Standard HD Highly opaque colour 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 313 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.

Applied on suitable substrates ink range TP 313 is suitable for outdoor applications.

ADJUSTMENT FOR PAD PRINTING

- Pad printing inks TP 313 are not supplied in a ready-to-print adjustment.
- **Processed as 1-component ink (without addition of hardener):**
Ink is adjusted to printing consistency by addition of thinner or retarder (stir with mixer or agitator).
- **Processed as 2-component ink (with addition of hardener):**
As 2-component ink TP 313 inks 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:

Alternatively, pad inks range TP 313 can be processed as 2-component ink. The following hardeners are available:

☒ **TP 219** (Standard), tends to yellowing, not suitable for outdoor applications.

TP 219/N, also suitable for outdoor applications

The hardener is mixed with TP 313 at a ratio of **ink : hardener = 10 : 1** (percent by weight).

Hardeners are sensitive to humidity. Therefore, containers always have to be tightly closed.

Pot life:

- Ink mixed with hardener may only be processed within a limited period of time (=pot life)
- **Pot life of TP 313 + hardener is approx. 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 thinners suitable for TP 313 inks are **Additive A** or **Additive U** ☒.

The additional products listed below should only be used if the required printing quality cannot be achieved using additives A or U (e.g. drying too slow or too fast).

Note: If TP 313 inks have to be free of aromatics or butyl glycolate or cyclohexanone only those products marked with symbol ☒ in this data sheet are suitable.

For adjustment of pad inks TP 313, the following products are available:

Thinner:	☒ Additive C	Extremely quick thinner, good solving power
	☒ Additive D	Very quick thinner, good solving power
	☐ Additive B	Quick thinner, good solving power
	☐ VD 40	Quick thinner, very strong solving power
	☒ Additive A	Standard thinner
	☒ Additive U	Standard thinner, free of cyclohexanone
	☒ VD 60	Slow thinner
Retarder:	☒ VZ 35	Very slow retarder
	☐ TPD	Very slow retarder
☒ = Product is free of aromatics, butyl glycolate, cyclohexanone, PAH		
☒ = 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 listed products 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
Antistatic paste	☑ STM-P1	Max. 10%	Possibly slightly reduced gloss
Retarder paste	LAB-N 111420/VP	Max. 10%	Possibly slightly reduced gloss
Viscosity increase	☑ Thickening powder	Max. 3%	Stir with mixer
Matting	☑ Matting powder	Max. 5%	Stir with mixer
Flow agent	☑ VM 11	1 - 5 %	Do not overdose!
Flow agent	VM 1	1 - 5%	Do not overdose!
Abrasion Additive	☑ LAB-N 561645	1 – 3%	Stir with mixer.
	☑ LAB-N 560469	1 – 3%	Stir with mixer

OVERPRINTING

Generally, it is not necessary to overprint TP 313 inks with varnish. However, overprinting to achieve an enhanced protection of ink layers is possible with TP 313/E50.

BRONZE COLOURS

Bronze colours are available upon request.

Printers can mix bronzes themselves using bronze pastes B 75, B 76, B 77 and B 79 as well as bronze powder B 78-POWDER. For examples of colour shades please refer to our Bronze Colour Card.

These “B” bronze pastes and “B” bronze powder are mixed with bronze binder TP 313/B or varnish TP 313/E50 prior to processing.

Mixing ratios in parts by weight:

Gold bronze paste/powder	to	TP 313/B or TP 313/E50	= 1 : 3 - 4
Silver bronze paste	to	TP 313/B or TP 313/E50	= 1 : 4 - 5

Bronzes B 75 to B 79 are prone to oxidation (Exception B 78-POWDER). Therefore, they should be overprinted, e.g. with TP 313/E50.

B 78-POWDER does not tend to oxidation. The pale copper shade will not darken with time. Colour of inks mixed with B 78-POWDER is similar to colour 78/AB as shown on our “bronze colour card”.

Note: When overprinting bronze colours (B/ AB/ MG) 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).

DRYING / HARDENER REACTION

1. **Processing WITHOUT addition of hardener:**
Ink dries physically, i.e. by evaporation of solvents.
2. **Processing WITH addition of hardener TP 219 or TP 219/N:**
First, ink dries physically, followed by chemical cross-linkage reaction.
Drying and reaction temperature of hardener must be at least 15°C when using TP 219 and 20°C using TP 219/N!

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.

Drying time is approx. 30 – 60 seconds at room temperature (20 – 25°). Drying time with heat application (e.g. hot air fan) and air circulation is about 10 - 20 seconds.

Complete drying may take several hours, also depending on the substrate.

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 does not react!	Ink film will not achieve any resistance
<20°C air drying		Hardener TP 219/N does 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	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

Resistance Tests

Resistances should not be checked before the ink has fully cured/cross-linked:

Drying with 20°C/>72h; with 80°C/>60 minutes.

CLICHÉ

All commercial types of clichés (polymer, thin and thick steel, ceramic) are suitable for processing TP 313 inks.

Note: Standard shades 17, 50 and 51 cannot be used for closed ink systems with a magnet holder as they contain pigments with iron oxide content.

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 to clean with our products additive C, U or VD 60.

PACK SIZE

Pad printing inks TP 313 are delivered in 1 litre containers. Other pack sizes are available upon request.

SHELF LIFE

In closed original containers, TP 313 inks generally have a shelf life of 5 years from date of production. Hardeners TP 219 and TP 219/N have a shelf life of 24 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 313 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"

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)					
Start formulations available in data base „Formula Management C-MIX 2000“					
According to colour card C-MIX 2000					
primrose	TP 313/Y30	magenta	TP 313/M50	black, low-grade PAH	TP 313/N58
golden yellow	TP 313/Y50	violet	TP 313/V50	white	TP 313/W50
orange	TP 313/O50	blue	TP 313/B50	varnish	TP 313/E50
scarlet	TP 313/R20	green	TP 313/G50		
red	TP 313/R50	black	TP 313/N50		
STANDARD Colour Range (medium opacity)					
According to colour card STANDARD 2 for pad printing inks or TP 218/ TP 313...					
Availability of further standard shades upon request					
citric yellow	TP 313/10-NT	carmine red	TP 313/22-NT	fir green	TP 313/41-NT
medium yellow	TP 313/11-NT	light blue	TP 313/30-NT	brilliant green	TP 313/42-NT
dark yellow	TP 313/12-NT	medium blue	TP 313/31-NT	light brown	TP 313/50-NT
orange	TP 313/15-NT	ultra marine	TP 313/32-NT	dark brown	TP 313/51-NT
ochre yellow	TP 313/17-NT	dark blue	TP 313/33-NT	white	TP 313/60-NT
light red	TP 313/20-N	Turquoise	TP 313/34-NT	black	TP 313/65-NT
bright red	TP 313/21-NT	Light green	TP 313/40-NT	black, low-grade PAH	TP 313/68-NT
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 313/10-HD-NT	bright red, highly opaque	TP 313/21-HD-NT		
medium yellow, highly opaque	TP 313/11-HD-NT	carmine red, highly opaque	TP 313/22-HD-NT		
dark yellow, highly opaque	TP 313/12-HD-NT	white, highly opaque	TP 313/60-HD-NT		
orange, highly opaque	TP 313/15-HD-NT	black, highly opaque	TP 313/65-HD-NT		
light red, highly opaque	TP 313/20-HD-NT	black, highly opaque, low-grade PAH	TP 313/68-HD-NT		
SPECIAL PRODUCTS: Special Colour Shades, Varnishes, Pastes					
Information about availability upon request					
white, matt	TP 313/60-MT-NT	transparent paste	TP 313/TP		
black, matt	TP 313/65-MT-NT	overprint varnish, matt	TP 313/70-MT		
bronze binder	TP 313/B				
4 COLOUR PROCESS INKS (CMYK)					
According to colour card STANDARD 2 or pad printing inks or TP 218/ TP 313...					
Upon request					
AB – BRONZE INKS and MG – METAL GLOSS INKS					
According to Bronze Colour Card					
AB Bronze Inks*		MG Metal Gloss Inks			
Upon request		Upon request			

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.

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Coates Screen Inks GmbH
Wiederholdplatz 1 90451 Nürnberg
Tel.: 0911 6422 0 Fax: 0911 6422 200
<http://www.coates.de>