

Product Data Sheet

Pad Printing Ink

SunChemical®
Coates Screen Inks

TP 400

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

APPLICATION

Pad printing ink range TP 400 is appropriate for a vast variety of applications. TP 400 inks are especially suitable for printing on thermoplastics such as polycarbonate (PC), PMMA ("acrylic glass"), polyamide (PA), pre-treated polyolefines, i.e. polypropylene (PP) and polyethylene (PE); also for rigid PVC, polystyrene, polyester, polyacetal (POM, with flame-drying), polyurethane. Also, for duroplastics, metals and coated surfaces.

TP 400 inks are a good choice for a variety of technical-industrial applications, toys and promotional articles.

PROPERTIES

- In line with current safety requirements pad printing inks TP 400 have been formulated with especially environmentally compatible raw materials. TP 400 inks as well as the thinners and additives required for adjustment do not contain aromatics, butyl glycolate (GB-Ester), cyclohexanone, Bisphenol A (BPA) 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 400 are solvent based pad printing inks. They can be processed as 1-component and (alternatively) as 2-component ink with hardener. Processed as 1-component ink TP 400 dries physically, as 2-component ink physically chemically-reactive and results in a satin gloss finish.
- The ink system shows an exceptionally easy and reliable printability.
- TP 400 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 good resistance against filling products, e.g. cosmetics and chemicals, especially when processed as 2-component ink.
- TP 400 inks are suitable for medium-term outdoor applications.
- TP 400 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 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 400 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.

Ink range TP 400 is suitable for medium-term outdoor applications.

ADJUSTMENT FOR PAD PRINTING

- **Pad printing inks TP 400 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.
- **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 400 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, up to 8h/20°C (=pot life).

Hardener:

Alternatively, pad inks range TP 400 can be processed with hardener as two component ink.

Hardeners are added to TP 400 inks at a mixing ratio of ink : hardener = 10 : 1. (parts by weight).

| | |
|---------------|--|
| TP 219 | Standard hardener |
| TP 219/N | Suitable hardener |
| TP 219/12 | hardener required for USP Medical Class VI certificate |

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 400 + 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 thinner suitable for TP 400 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).

For adjustment of pad inks TP 400, the following products are available:

| | | |
|------------------|--|--|
| Thinner: | <input type="radio"/> Additive C | Extremely quick thinner, good solving power |
| | <input type="radio"/> Additive D | Very quick thinner, good solving power |
| | <input checked="" type="radio"/> Additive U | Standard thinner, free of cyclohexanone |
| | <input type="radio"/> Additive R | Thinner, good solving power |
| | <input type="radio"/> VD 60 | Slow thinner |
| Retarder: | <input type="radio"/> VZ 35 | Very slow retarder |
| | <input checked="" type="checkbox"/> = Preferred | <input type="checkbox"/> = If required |
| Note: | For printing with thick and thin steel clichés sensitive to corrosion | |
| | <input type="radio"/> Additive U/00 | Standard thinner with anti-corrosion additive |
| | <input type="radio"/> 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 | Matting powder | Max. 5% | Stir with mixer |
| Antistatic agent (paste) | STM-P1 | Max. 10% | Possibly slightly reduced gloss |
| Flow agent | VM 11 | 1 - 5% | Do not overdose! |

OVERPRINTING

Generally, it is not necessary to overprint TP 400 inks with varnish. However, overprinting to achieve an enhanced protection of ink layers is possible with TP 400/E50.

BRONZE COLOURS

Bronze colours 75/MG to 79/MG (metal gloss) are available.

“B” bronze pastes, “B” bronze powder and “AB” bronze colours are not available in TP 400 ink range to avoid a possible introduction of aromatics and ensure compliance of PAH threshold values (e.g. AfPS GS 2014:01 PAH).

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).

DRYING / HARDENER REACTION

- Processing WITHOUT addition of hardener:**
Ink dries physically, i.e. by evaporation of solvents.
- Processing WITH addition of hardener TP 219, TP 219/12 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 or TP 219/12 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.

Depending on local conditions, average drying time is approx. 2 – 3 minutes. 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.

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 219/12 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 | 3 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.

After oven curing allow a cooling time of at least 1h.

CLICHÉ

All commercial types of clichés (polymer, thin and thick steel, ceramic) are suitable for processing TP 400 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 to clean with our products additive C, U, R or VD 60.

PACK SIZE

Pad printing inks TP 400 are delivered in 1 litre containers. Other pack sizes are available upon request.

SHELF LIFE

In closed original containers, TP 400 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 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

- **EUPIA:**
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.
- **EN 71-3:2019:**
Pad printing inks range TP 400 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).
- **USP Medical Class VI:**
Processed with hardener TP 219/12, TP 400 is certified for use on medical articles according to USP Medical Class VI.
- 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) | | | | | |
| Start formulations available in data base „Formula Management C-MIX 2000“ | | | | | |
| According to colour card C-MIX 2000 | | | | | |
| primrose | TP 400/Y30 | red | TP 400/R50 | green | TP 400/G50 |
| golden yellow | TP 400/Y50 | magenta | TP 400/M50 | black | TP 400/N58 |
| orange | TP 400/O50 | violet | TP 400/V50 | white | TP 400/W50 |
| scarlet | TP 400/R20 | blue | TP 400/B50 | varnish | TP 400/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 400/10-HD | carmine red, highly opaque | TP 400/22-HD | | |
| medium yellow, highly opaque | TP 400/11-HD | light blue, highly opaque | TP 400/30-HD | | |
| dark yellow, highly opaque | TP 400/12-HD | violet, highly opaque | TP 400/37-HD | | |
| orange, highly opaque | TP 400/15-HD | light green | TP 400/40-HD | | |
| light red, highly opaque | TP 400/20-HD | white, highly opaque | TP 400/60-HD | | |
| bright red, highly opaque | TP 400/21-HD | black, highly opaque | TP 400/68-HD | | |
| SPECIAL PRODUCTS: Special Colour Shades, Varnishes, Pastes | | | | | |
| Information about availability upon request | | | | | |
| Not available yet. | | | | | |
| 4 COLOUR PROCESS INKS (CMYK) | | | | | |
| According to colour card STANDARD 2 for pad printing inks or TP 218/ TP 300 | | | | | |
| process yellow | TP 400/180 | process black | TP 400/N58 | | |
| process magenta | TP 400/181 | varnish (for brightening) | TP 400/E50 | | |
| process cyan | TP 400/182 | | | | |
| 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 400 range | | | rich gold | TP 400/75-MG | |
| | | | rich pale gold | TP 400/76-MG | |
| | | | pale gold | TP 400/77-MG | |
| | | | copper | TP 400/78-MG | |
| | | | silver | TP 400/79-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.

January 2021 - Version B6

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