Product Data Sheet
Pad Printing Ink

SunChemical®
a member of the DIC group
Color & Comfort

TP E-HF

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

APPLICATION

Pad printing ink range TP E-HF is suitable for printing on various thermoplastics, especially ABS, SAN, ASA, polystyrene (PS), rigid PVC, PMMA ("acrylic glass") and polycarbonate (PC).
In addition, as a 2-component system and/or after pre-treatment of substrates (flame, corona) TP E-HF inks can also be printed on polyester, polyamide (PA) and some coated surfaces.

PROPERTIES

- Pad inks TP E-HF 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 E-HF have been formulated with especially environmentally compatible raw materials.**
  The inks are free of halogens according to DIN EN 61249-2-21*.
  In addition, TP E-HF inks do not contain aromatics, butyl glycolate (GB-Ester), cyclohexanone, Bisphenol A (BPA) and also no polycyclic aromatic hydrocarbons (PAH).
  Exception: Black colours N50-HF, 65-HF and 65-HD-HF (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-HF, 68-HF or 68-HD-HF are suitable.
  Thinner/Additives Only those products marked with symbol ☑ in this data sheet are suitable.
- Processed as 1-component ink TP E-HF dries physically, as 2-component ink physically chemically-reactive
- TP E-HF inks are quick drying and result in a glossy finish. This ink range can be used on flat pad printing and rotation printing equipment.
- TP E-HF prints show a good abrasion resistance and good resistance against alcohol and benzines. These resistance properties can be improved by processing TP E-HF as a 2-component system.
- Processed as 2-component system TP E-HF inks will also show adhesion or increased adhesion on difficult substrates.
- Ink range TP E-HF is suitable for 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

- As this system only contains pigments free of halogens* not all colour shades of the C-MIX 2000 range are identical. More information see table in section 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 E-HF 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 E-HF is suitable for outdoor applications.

ADJUSTMENT FOR PAD PRINTING

- Pad printing inks TP E-HF 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 E-HF 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 E-HF 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 E-HF at a ratio of **ink : hardener = 8 : 1** (parts 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 E-HF + hardener is approx. 6 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 – 30 % by weight of thinner or retarder.
Generally, the thinner suitable for TP E-HF 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 E-HF, 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, free of cyclohexanone**
	☑○ VD 60	Slow thinner
Retarder:	☑○ VZ 35	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!

OVERPRINTING

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

BRONZE COLOURS

For technical reasons bronze colours are not available.
If compliance of PAH threshold values (e.g. AfPS GS 2014:01 PAH) is not required, bronze colours can be mixed using our "B" bronze bronze pastes B 75, B 76, B 77 and B 79 as well as bronze powder B 78-POWDER.

These "B" bronze pastes and "B" bronze powder are mixed with varnish TP E/E50-HF prior to processing.

Mixing ratios in parts by weight:

Gold bronze paste/powder	to	TP E/E50-HF	=	1 : 3 - 4
Silver bronze paste	to	TP E/E50-HF	=	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 E/E50-HF.

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 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 E-HF 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 or VD 60.

PACK SIZE
Pad printing inks TP E-HF are delivered in 1 litre containers. Other pack sizes are available upon request.

SHELF LIFE
In closed original containers, TP E-HF 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
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 E-HF basic colour shades, highly opaque standard colours (HD) and process 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

BASE COLOUR SHADES

Mixing system for matching of PMS, HKS, RAL colours (on white substrates)
According to colour card TP E-HF

primrose	TP E/Y30-HF	magenta	TP E/M50-HF	**black, low-grade PAH**	**TP E/N58-HF**
golden yellow	TP E/Y56-HF	violet	TP E/V56-HF	white	TP E/W50-HF
orange	TP E/O56-HF	blue	TP E/B50-HF	varnish	TP E/E50-HF
scarlet	TP E/R26-HF	green	TP E/G56-HF		
red	TP E/R50-HF	black	TP E/N50-HF		

Note:
Colour shades 26 or 56 are only similar, however not identical to our C-MIX Colours
Y56 ≈ Y50, O56 ≈ O50, R26 ≈ R20, V56 ≈ V50, G 56 ≈ G50

STANDARD Colour Range (medium opacity)

Not available

STANDARD Colour Range HD (high opacity)

According to colour card STANDARD HD or HD-P for pad printing inks
Availability of further standard HD shades upon request

white, highly opaque	TP E/60-HD-HF	**black, highly opaque, low-grade PAH**	**TP E/68-HD-HF**
black, highly opaque	TP E/65-HD-HF		

SPECIAL PRODUCTS: Special Colour Shades, Varnishes, Pastes

Information about availability upon request

black, low-grade PAH	**TP E/68-HF**	

4 COLOUR PROCESS INKS (CMYK)

According to colour card STANDARD 1 or pad printing inks or TP 247/ TP 249…

Upon request	

AB – BRONZE INKS and MG – METAL GLOSS INKS

According to Bronze Colour Card

AB Bronze Inks*	**MG Metal Gloss Inks**
Not available	**Not available**

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.

Footnotes:
*Free of halogens according to DIN EN 61249-2-21
Chlorine content < 900 ppm, bromine < 900 ppm, total content of chlorine and bromine < 1500 ppm

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 B7***

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