

Product Data Sheet

Screen Printing Ink

SunChemical[®]
Coates Screen Inks

TCX BF

UV-curing Thermochromic Screen Ink Range, 1-Component

APPLICATION

UV-curing screen printing ink range of thermochromic colours for printing on PVC. Especially rigid and plasticized PVC, primer-coated polyolefin and polyester foils, polycarbonate, paper and cardboard.

PROPERTIES (GENERAL)

- Solvent-free UV-curing screen printing inks TCX BF have a high reactivity.
- TCX BF inks are delivered in a ready-to-print adjustment. They cure quickly resulting in a glossy finish.
- The cured ink film shows good flexibility with high mechanical abrasion resistance.
- Ink range TCX BF has been formulated with BPA-free pigments and replaces the former TCX, which did contain a small amount of BPA.
- Note: Due to this complex application, we recommend pre-tests to confirm suitability of TCX BF inks.

THERMOCHROMIC PROPERTIES

- Thermochromic inks have a low opacity. It is only possible to apply masking prints on the substrates with black colours using high layer thicknesses (multiple prints).
- Colour intensity also depends on layer thickness.
- Thermochromic colours are sensitive to temperature.
- Below a set temperature the prints are coloured. If subjected to temperatures above the defined reaction temperature of the pigments the colours start to become brighter and then change to colourless.
- This colour change is reversible. Original colour will reappear after cooling down.
- Basically, the possible temperature spectrum ranges from -5°C to +65°C.
- Colour change starts from 5°C below the defined reaction temperature.
- **Just like all thermochromic materials TCX BF prints are sensitive to light and heat. Long-term exposure to direct sun light and/or high temperatures should be avoided. Otherwise colour intensity will decrease. Short term temperatures up to 140°C are possible and will not cause any significant lasting change...**

COLOUR SHADES - OVERVIEW

- Standard Colours: Red, blue, black
- Special Colours: Upon request Yellow, green, violet, orange, magenta
- Standard temperature: 31°C Other temperature ranges upon request.
- Information about these colour shades in the detailed tables in section Colour Shades.

MIXING WITH OTHER COLOURS

- TCX BF colours can be mixed with colour shades of the UVN ink range to obtain further colour effects. A mixture of a thermochromic blue with a conventional yellow for instance will result in a green shade. When warmed up this mixed colour will change from dark green to light green and then to pure yellow.

CHOICE OF PIGMENTS AND LIGHT FASTNESS

- Colour shades of TCX BF ink range contain pigments which will lose their thermochromic properties when subjected to long-term sun light. Therefore, TCX BF inks are not suitable for outdoor applications.
- According to the pigment manufacturer the life cycle of possible colour changes is 1.500 – 2.000 cycles. However, as mentioned above, other factors may influence this period. We cannot guarantee a certain number of cycles.

ADJUSTMENT FOR SCREEN PRINTING

- Screen printing inks TCX BF are supplied in a ready-to-print adjustment. Generally, addition of auxiliary agents is not necessary.
- For some rare and special applications and depending on local conditions, addition of certain agents/additives is possible.
- Prior to printing, the inks should be stirred well to obtain a homogeneous dispersion of all ingredients.

AUXILIARY AGENTS

Application	Product	Addition in % by weight	Additional Information
Thinning	Additive UV/V*	Max. 10%	Standard thinner
Reactivity increase	LAB-N 551564	1 - 3%	Photoinitiator
	LAB-N 560700	3 - 5%	Photoinitiator
Flow agent	Additive UV/VM	1 - 2%	Do not overdose!
	Additive UV/N	1 - 2%	Wetting agent, also promotes flow properties.

* Thinner Additive UV/V is a reactive UV monomer, not a commercial solvent!

OVERPRINTING

If necessary TCX BF inks can be overprinted with varnish UVN/E50.

BRONZE COLOURS, MIXING OF BRONZE INKS

Not applicable.

DRYING / UV-CURING

- TCX BF inks only dry/cure under UV-radiation.
- Suitable UV-driers with Hg medium-pressure lamps (250 – 400 nm) and an efficiency between 80 and 200 W/cm have to be used.
- Preferably, use reflectors with a focussed radiation.
- Ensure an even radiation (intensity/distance to the lamps) of the whole printed image.
- Curing parameter depend on thickness of printed ink layer, colour, substrate or substrate quality and temperature as well as construction and performance of the UV drier.
- Curing energy required depends on number of printed ink layers (check intermediate adhesion), printed layer thickness, colour and type of substrate. Hence, printers should determine the exact required energy with their own UV-drier.
- **UV-curing energy guide values:**
(printed with 150-31 fabric, white substrate)
UV-energy: 200-300 mJ/cm²
(measured with Kühnast UV-integrator, 250 – 410 nm, max. 365 nm)
Belt speed: UV-radiator: 1 x 120 W/cm: 10 - 15 m/min.
2 x 120 W/cm: 20 - 30 m/min.
- Adhesion should only be checked several minutes after curing. Due to the post-curing process of the ink and depending on the substrate, sufficient adhesion may sometimes only be achieved after up to 24 hours.

SCREEN FABRIC / STENCILS

- TCX BF inks are formulated for printing with fabrics of 77 – 150 threads/cm.
- For black TCX BF we recommend 77 threads/cm fabric. To achieve high opacity double printing may be required.
- Printability and especially UV-curing properties with coarser or finer fabrics should be evaluated by corresponding trials.

All copy emulsions and capillary films suitable for solvent based and UV-curing screen inks can be used, such as our program of SunCoat or Murakami products.

RESISTANCES**Environmental influences**

- Generally, thermochromic materials are very sensitive against light and heat.
- Long-term exposure to direct sun light and/or high temperatures should be avoided. Otherwise colour intensity will decrease. Short term exposure to temperatures up to 140°C is possible and will not cause any significant lasting change.

Chemical influences

- TCX BF inks are sensitive to some organic solvents.
- Remove all residues of screen cleaning agents from the stencil prior to printing.
- Ink may only be mixed with appropriate thinners or UVN inks. Otherwise the thermochromic pigments will be destroyed.

CLEANING

Uncured UV inks can be removed from stencils and tools using our solvent based universal cleaning agents of the URS range.

Cleaning of cured UV inks is very time-consuming and hardly ever possible.

Note: As the acrylates contained in these UV inks may cause skin irritation, clean contaminated skin with water and soap immediately. Remove and clean contaminated clothing straightaway.

PACK SIZE

Screen printing inks TCX BF are delivered in 1 litre containers. Other pack sizes are available upon request.

SHELF LIFE

In closed original containers, TXC BF inks generally have a shelf life of 1 year from date of production.

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.

Further compliance confirmations are available upon request.

ADDITIONAL INFORMATION ABOUT OUR PRODUCTS

Product data sheets: Auxiliary Agents for UV-Curing Screen Printing Inks

Brochures: UV-Curing Screen Printing Inks

Internet: Various technical articles are available for download on www.coates.de, section "SN-Online"

FOR COLOUR RANGE, PLEASE REFER TO NEXT PAGE.

COLOUR SHADES

STANDARD COLOUR RANGE		
Temperature range 31°C	red	TCX BF-R31
	blue	TCX BF-B31
	black	TCX BF-N31

Further temperature ranges and colour shades upon request.

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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