



B&H Colour Change

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THERMOCHROMIC UV SCREEN INK

DESCRIPTION

Thermochromic screen inks, in printed form, are coloured below a specific temperature, and change to colourless or to another, lighter colour as they are heated through a defined temperature range. These inks are available in various colours and activation temperatures. Standard activation temperatures are 15, 25 and 43° C (59, 77 and 109° F). Other activation temperatures are also available, from -5° C to 60° C. The activation temperature is defined as the temperature above which the ink has completely changed to its final clear or light colour end point. The colour starts to fade at approximately 4° C below the activation temperature and will be in between colours within the activation temperature range. The colour change is "reversible," i.e., the original colour will be restored upon cooling. Screen ink is ideal for promotional items, temperature indicating labels, games, novelties, etc.

TYPICAL PROPERTIES

Viscosity (at 25° C)	90-120 poise
Density (Approx.)	1.08kg / ltr
Appearance	Viscous Liquid
Percent Solids (Approx.)	90%
Percent Volatiles (Approx.)	<6%
Recommended Substrates	Paper, Film

STORAGE AND HANDLING

The inks have excellent stability when stored in a cool, dry place. The material is combustible and should not be used near open flame. Store between 20 and 26° C. Ink must be used within three months of purchase. Storage longer than six months not recommended. Consult MSDS prior to product use.

SPECIAL CARE INSTRUCTIONS

UV screen ink is simple to use, but it is a little different from other UV screen inks. The differences between our ink and regular UV screen inks are outlined below. The instructions below should be followed carefully to achieve optimal results.

- Do not allow Ink to come in contact with unapproved solvents. To ensure this, always dry the screen completely before adding the ink to the screen. Always be sure that equipment that comes in contact with the ink is completely dry and free of all solvents. Also, when cleaning the screen in the middle of the run, do not allow any solvent to touch the unused ink.
- Be sure to stir the ink well before and during use.
- A coating thickness of at least 2 mils is recommended for best results, due to the low opacity of thermochromics. Use lower mesh screens with thermochromic ink. Finer meshes may work with some formulations. Coarse screens, such as an 80-150 mesh are required to achieve the heavy laydown necessary to get good opacity. Rotary screen emulsions can be over-exposed to ensure best resistance to emulsion breakdown. You may wish to experiment to achieve the best results.
- As this is a translucent ink, for best colour print over white or light colours. It prints as a normal translucent ink, not an opaque ink, and can cover or obscure other solid colours only when printed heavily (2-3 mils).

- Use normal solvents, but be sure screens are dry before adding thermochromic ink.
- B&H has extenders and thinners should you need them. Use B&H approved thinners only.
- Do not over-cure, as any yellowing caused by over-curing will be readily visible when the ink heats up and changes colour.
- This ink will work well with most types of coated and uncoated stocks, as well as many plastics. Compatibility of ink, coating and substrate must be determined prior to production runs.

SENSITIVITY

Thermochromic materials are sensitive to adverse environmental conditions. These are listed below, along with a description of the nature of the sensitivity, and recommendations with regards to them.

LIGHT: Most significantly, long exposure to UV and some fluorescent lights can degrade colour intensity and changing characteristics of the ink. Extreme exposure of more than several days of direct sunlight may degrade the colour of the ink, though it will probably still change colours. More than 600 hours of a strong fluorescent light may also cause a loss of colour in the thermochromic. This is true of many different pigments and dyes. In handling these materials, a good rule of thumb is to assume that they are about as sensitive to light as fluorescent pigments are.

HEAT: Extended exposure to very high temperatures, i.e., 38° C or higher, can also degrade the pigment. The effect of light exposure seems to be additive over time. However, with heat, the exposure only has an effect if a given temperature is constantly maintained for a given amount of time.

CHEMICALS: Thermochromic materials are sensitive to chemical exposure as well. Since it is very unlikely that the printed piece will come into contact with deleterious chemicals under normal conditions, this should not be of great concern. On the other hand, because of the chemical sensitivity and softness of this ink, it also has excellent anti-alteration properties.

CONCLUSION: In short, this ink should be stored in a cool, dry place, away from direct exposure to light, especially sunlight. This is true of both the printed ink and the wet ink. Ink in the can should be used within six months of receiving it. If the colour or colour reaction is compromised in a security environment, one need only to continue to verify the authenticity of the document by other means; ghost watermark, bleed through inks, etc. We predict that with proper handling, the failure rate of the ink will be less than one half of one percent, and as mentioned above, this means that one need only continue to verify authenticity and not redeem the document for cash until confirmation is established.

NOTE REGARDING HYSTERESIS: Reversible thermochromics exhibit what is referred to as “hysteresis.” In other words, if a standard “Body Temperature” ink is raised to an extreme temperature, say above 65° C (as with a curing unit), then left to cool under normal ambient conditions (18° to 24° C), the ink may not achieve its full colour, even after it reaches room temperature. Although, under normal circumstances the ink should have full colour up to 7-8 degrees below the stated activation temperature, once exposed to this kind of temperature “spike,” one may need to lower the ink’s temperature to below 50° F to gain improved behavior. **ALL APPLICATIONS USING COLOUR-CHANGING INKS OF ANY KIND SHOULD BE THOROUGHLY TESTED PRIOR TO APPROVAL FOR PRODUCTION.**

For further information or assistance, please contact B&H Colour Change, +44 (0) 845 458 4121.

DISCLAIMER: Information in this Product Data Sheet is compiled from our general experience and data obtained from various technical publications. While we believe that the information provided herein is accurate at the date hereof, no responsibility for its completeness or accuracy can be assumed. Tests at B&H Colour Change are carried out under controlled laboratory conditions. Information is given in good faith, but without commitment as conditions vary in every case. The information is provided solely for consideration, investigation and verification by the user. B&H Colour Change do not except any liability for any loss, damage or injury resulting from its use (except as required by law). Please refer to the Material Safety Data Sheet before using products to ensure safe handling.