



Technical Product Information

Functionality: Reversible Thermochromic ink

Article No: 1410

Revision: 03

Last Revision: 14/04/2015

Description

THERMOSTAR® Water based Thermochromic ink for absorbent paper and board substrates. THERMOSTAR® Water Based Screen Ink is supplied as a 1 parts system. The ink is available as Bisphenol A free grades for most colours and temperatures.

Application

THERMOSTAR® water based Screen printing ink ideally suited to flat-bed screen printing processes onto absorbent paper and board substrates for applications such as labels, tags, tickets and boards. As with all Thermochromic inks the printed effect is dependent upon several factors including press speed, substrate, drying time/temperature and mesh count. The prints exhibit a matt finish. Therefore, it is always recommended that over laminate or spot varnish is used to give a glossy aspect.

Product Properties

Thermochromic properties

THERMOSTAR® Water Based Screen Ink brings **reversible colour changing properties** to printed items. The print is fully coloured 3-5 degrees below the activation temperature and colourless above the activation temperature.

Standard activation temperatures are 15, 31 and 47°C (59, 88 and 117°F). Activation temperatures included within -10 and +69°C (14 and 149°F) are also available.

Adhesion

THERMOSTAR® Water Based Screen Ink is suitable for absorbent paper and boards. Due to the wide variety of substrates it is recommended that this ink is evaluated fully prior to any commercial use. In some cases 1-3 % Aziridine (cas number: 64265-57-2) can be added for better adhesion and also better water resistance. The modified ink will then show viscosity increase over time, resulting in a reduced shelf life. Carbodidimide is another potential option where less hazards are associated.

Rub Resistance

An over varnish or laminate is necessary if any resistance to abrasion is required as resistance to pressure is low if the Aziridine option is not considered.

Overprintability/Lamination Properties

Both heat and cold set laminates can be used with THERMOSTAR® WB Screen Inks.

THERMOSTAR® WB Screen Inks can be also overprinted with UV offset, UV flexo and UV screen varnish. However an evaluation for compatibility should always be carried out prior to commercial use. When THERMOSTAR® Water Based Screen Ink is intended for overprinting onto a surface pre-printed with offset inks, it is recommended that the offset inks are wax free. For applications that use a Thermochromic ink activated at cold temperatures (less than 20°C/68°F) we recommend the use of a matt laminate for optimum effect. For warm and hot temperatures activation inks (20°C/ 68°F and above), we recommend a gloss laminate.

Additional Product Properties

Pigment Content (%)	24 ± 1.5
Pigment Size (µm)	95% less than 6 microns
Solid Content (%) ¹	46 ± 2.0
Solvent	Water
Supplied Viscosity (cps) ²	>5000

¹ AMB50 Moisture Content Analyzer

² Mixed ink measured on a LVT Brookfield Viscometer Spindle #2

Light fastness

Thermochromic inks are inherently susceptible to damage by UV light. They are only recommended for use in applications with minimal exposure to UV light. UV protective varnish can be used to slow degradation.

Light fastness properties of supplied THERMOSTAR® colours are as follows:*

Green	1
Red, Orange & Magenta	1-2
Yellow, Blue, Purple	2
Turquoise	3

*Rating according to measurement on Blue Wool Scale

Heat Behaviour

Reversible Thermochromics are showing thermal Hysteresis. Temperature against colour on the heating cycle does not match the cooling cycle. Thermochromics consistently heated up at temperatures above 50°C (122°F) will slowly lose colour intensity below the activation temperature.

Recommended Printing Parameters

Screen Configuration

The optimum screen configuration depends on several factors, the most important of which is the desired opacity and colour of the finished product. The theoretical ink volume of the screen is crucial for matching the desired effect. Using a higher theoretical ink volume will affect the print as follows:

- Below the activation temperature, colour intensity is increased
- Beyond the activation temperature, the level of residual colour is increased accordingly.

	Activated Below 20°C	Activated Above 20°C
Recommended Mesh Size	90T	70T
Minimum Mesh Size	150T	150T

Do not allow the ink to sit dormant on the screen as this will cause 'drying in' on the screen and effect print definition and quality.

Ink Consumption

Typical ink consumption for THERMOSTAR® Water Based Screen Ink on a 70T mesh is approx 30 – 35gms per sqm. When obliterating an image, 2 passes may be required.

Dilution

The printing ink is supplied in a format that once mixed is at printing viscosity. Should the ink need to be thinned to suit application then only water should be used. No alternative thinners should be used as these will affect both the performance of the ink and Thermochromic function. No more than 10% water should be added to the ink system.

Drying

The ink should be dried using hot air dryers or IR lamps set to a maximum temperature of 70°C/158°F. Care should be taken when stacking the finished product as if too much pressure is applied to uncoated ink (not varnished or laminated) offsetting of the print can occur.

Mixing Instructions:

Recommended Mixing Ratio 1 Part Binder to 1 Part Pigment

It is recommended that a mechanical stirrer or similar device is used to blend binder and pigment effectively. Never use bead or ball mills to blend the ink parts together.

The ratio of pigment to binder can be increased or decreased depending upon the effect required. If the ratio of binder to pigment is altered this ink must be evaluated fully prior to any commercial use.

Do not mix with other ink systems.

Cleaning recommendations

THERMOSTAR® Water Based Screen Ink should be cleaned on screen using water only. Glycol based cleaners should not be used as these will damage the function of the ink.

After use, screens can be cleaned with water. A high powered water jet may be required to remove all ink remnants.

Handling and Storage

THERMOSTAR® Water Based Screen must be stored away from solvents, sources of UV light and temperature above 25 C. As the product is water based, it is important to keep the containers tightly shut to avoid evaporation and skinning of the product. Mix thoroughly the ink before use. Do not freeze

Shelf Life of Mixed Ink 3Months

Please consult MSDS prior to use.

Material Safety Data Sheet No: 1410 or 1412

Information in this Product Data Sheet is compiled from our general experience and data obtained from various technical publications. Whilst we believe that the information provided herein is accurate at the date hereof, no responsibility for its completeness or accuracy can be assumed. Tests 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. We 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.

