

Technical Data Sheet

Thermochromic Gravure Inks (Water Based) Reversible Temperature Reactive Material

Thermochromic Gravure Inks (Water based) for absorbent paper and board substrates. Thermochromic Water Based Gravure Inks are supplied as a ready to use ink system to give optimum shelf life and on press flexibility for control of color intensity, opacity and press performance.

Colors and Activation Temperatures

The activation temperature is defined as the temperature above which the ink has almost achieved its final clear or light color end point. The color starts to fade at approximately 4°C below the activation temperature and will be in between colors within the activation temperature range. The color change is "reversible," i.e., the original color will be restored upon cooling.

Colors include Black, Blue, Magenta, Green, Orange, Red, Purple, Brown and Custom Matching is available.

Activation Temperatures can be set anywhere between 10°C through 69°C. It is defined as the temperature above which the pigment has almost (>95%) achieved its final clear or light color end point.

Application

Thermochromic Water Based Gravure ink is suitable for in line gravure printing onto paper, carton 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.

Printing Recommendations

- Cylinder Configuration

The optimum cylinder configuration depends on several factors, the most important of which is the desired opacity and Color of the finished product. The theoretical ink volume of the cylinder is crucial for the desired effect. Using a higher theoretical ink volume will increase the intensity of color of the product when below its activation temperature.

- Printing Speed

The maximum press speed is dependent on press setting, substrate, and chosen cylinder. With sufficient heating power press speeds of 560 m/min are realistically achievable. Faster speeds are frequently achieved without any issue.

Dilution

The printing ink is supplied in a format that that is at printing viscosity. Should the ink need to be thinned, then a mixture of isopropanol and water mixed at a 1:1 ratio only can be added. No more than 5% diluent should be added. No other diluents should be used as these can minimize ink performance and damage the Thermochromic functionality

Drying

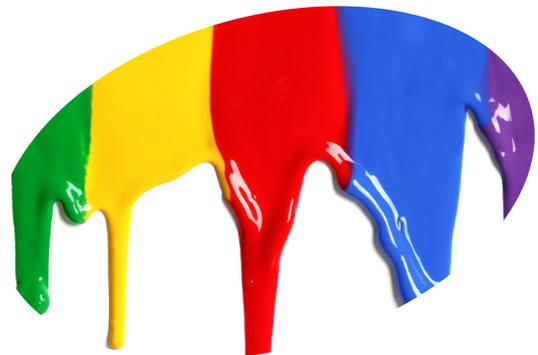
The ink should be dried using hot air dryers or IR lamps set to a maximum temperature of 70°C/158°F.

Cleaning Recommendations

After use the cylinder can be cleaned with water or with a standard commercial general purpose cylinder cleaner/wash. Care should be taken not to contaminate the Thermochromic ink with any cleaning solution as this can inhibit the Thermochromic function.

Technical Specifications

Pigment Content:	24% +/- 1.5%
Particle Size:	<6 microns (95%)
Solid Content:	50% +/- 2.0%
Solvent:	Water
Supplied Viscosity:	55 cps



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Storage and Handling

Thermochromic Water Based Gravure Inks are ready to use ink system that will remain stable if kept in original containers and stored in the correct storage conditions. As the product is water based it is important to keep the containers tightly shut to avoid evaporation and skinning of the product.

Thermochromic Water Based Gravure Inks should be stored away from solvents, sources of UV light and high temperature. Ink should be thoroughly mixed prior to application. Please consult MSDS prior to use.

Shelf Life of Ink 3 Months

Do not store in temperatures in Excess of 25°C/77°F

Do not freeze

Sensitivity

Rub Resistance

The ink exhibits good rub resistance properties on absorbent substrates. If a higher level of resistance is required or if the printed product is going to be exposed to humid conditions then a suitable over varnish or laminate should be used.

Light

Thermochromic inks are inherently susceptible to damage by UV light. They are only recommended for uses in applications where there would be minimal exposure to UV light. Where necessary a suitable UV protective varnish should be used to slow degradation caused by UV light.

Light fastness properties of supplied Thermochromic colors are as follows:*

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

*Rating according to measurement on Blue Wool Scale

Adhesion

Thermochromic Water Based Gravure 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.

Overprintability/Lamination Properties

Both heat and cold set laminates can be used with Thermochromic Water Based Gravure Ink. Thermochromic Water Based Gravure Inks can be also overprinted with UV offset; UV Gravure and UV screen varnish. However an evaluation for compatibility should always be carried out prior to commercial use.

For applications that use a Thermochromic ink that is activated at cold temperatures (less than 20°C/68°F) we would recommend the use of a matt laminate for optimum effect. For warm and hot temperature activation inks (20°C/68°F and above) we would recommend a gloss laminate.

Heat Behavior

Reversible Thermochromics are showing thermal Hysteresis. This means temperature against color curves on the heating cycle does not match the cooling cycle curve. Thermochromic prints can experience far more than 1000 heating/cooling cycles above their activation temperature. Thermochromics consistently heated up at temperatures above 50°C (122°F) will slowly lose color intensity below the activation temperature.

All Applications using any QCR Solutions Corp products should be thoroughly tested prior to approval for production.

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 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.