

Technical Data Sheet

Thermochromic Pigments

Reversible Temperature Reactive Material

Thermochromic Pigments are thermochromic micro capsules in a powder pigment form. They have been specially designed for use in non aqueous based ink systems although their use is not limited to this. They can be used to formulate non aqueous based flexographic, UV, Screen, Offset, Gravure and Epoxy Ink formulations (for aqueous applications we would recommend using Thermochromic slurries). 'Thermochromic Powders' are colored below a specific temperature, and change to colorless or to another, lighter color as they are heated through the temperature range. These pigments are available in various colors and activation temperatures.

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.

Technical Specifications

Solids:	98% +/- 2%
Particle Size:	<6 microns (97%)
Light Fastness (Blue wool Scale):	1 – 2
Shelf Life:	12 months

All raw materials used for production of Thermochromic pigments are listed in EINECS, TSCA and DSL/NDSL.

Storage and Handling

Thermochromic Powders are more sensitive to the influences of solvents, UV light, pH, Shear and temperature than many other types of pigment. It should be noted that there are differences in performance of the various colors so that each should be thoroughly tested before commercial application.

Thermochromic Powders have excellent stability when stored away from heat. Store below 25°C. Do not allow to freeze, as this will damage the thermochromic capsules. A shelf life of 12 months is guaranteed provided that the material is stored in a cool and dark environment. Long term exposure to UV light or elevated temperature can cause loss of thermochromic function. Storage longer than twelve months is not recommended. Consult product MSDS prior to use.

Sensitivity

THERMOCHROMIC microcapsules 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.

Mixing

Thermochromic Powders should be mixed thoroughly before use as contents may settle on transit. They can withstand most standard mixing procedures. No intense shear is necessary as the capsules are in primary particle form. If too much shear energy is used (e.g. bead mills) then the micro capsules can be crushed and the thermochromic function destroyed.

Light

Long term exposure to UV and some fluorescent lights can degrade color intensity. Extreme exposure of more than several days of direct sunlight may degrade the color of the microcapsules, though it will probably still change color. More than 600 hours of a strong fluorescent light may also cause a loss of color in the thermochromic.



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Heat

Extended exposure to high temperatures of 50°C or higher can degrade the pigment. With heat the exposure only has an effect if a given temperature is constantly maintained for a given amount of time. Thermochromic microcapsules can survive temperatures >200°C however they can only be exposed to these temperatures for a very short periods of time (<10 seconds).

Chemicals

Thermochromic powder can be incorporated into many types of non aqueous and UV curing formulations, however, thermochromic materials are sensitive to chemical exposure. Care must be taken to avoid the use of polar solvents such as alcohols, acetates etc. as these can damage the micro capsule walls.

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.