



## Technical Data Sheet

### **Thermochromic Ceramic Mug Kit (Water Based)** Reversible Temperature Reactive Material

**Thermochromic Ceramic Sprayable System** (Water based) contain a range of high performance Thermosetting Water Based Polyurethane coatings designed to give a chemical resistant finish to ceramic-based articles. The coating range has been developed to provide a VOC compliant coating of excellent flow and image clarity. The appearance of the product is maintained during processing due to the high degree of abrasion resistance inherent in the polymer system.

#### **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**

The product is supplied as a 3 parts system and designed to be applied by both conventional spray and electrostatic disc equipment to spray onto ceramic, metal, glass surfaces. The product exhibits a matt finish when applied. Over lacquer of a suitable industry standard coating is always recommended to protect the Thermochromic materials once applied.

#### **Product Properties**

##### **Adhesion**

Thermochromic water based ceramic sprayable systems are dedicated to be applied onto ceramic, glass and metal substrates. Due to the wide variety of substrates it is recommended that this coating system be evaluated fully prior to any commercial use.

##### **Substrate Preparations**

The substrate must be clean, free from contaminants and grease. If small areas of contamination are evident then localized cleaning with surfactant wash is recommended. On highly contaminated articles, steam degreasing is advised.

#### **Over printability Properties**

We recommend Thermochromic water based ceramic sprayable system to be top coated with a suitable glossy coating. For applications that use a Thermochromic Water Based Sprayable System that is activated at cold temperatures (less than 20°C/ 68°F) we would recommend the use of a matt top coating for optimum effect. For warm and hot activation temperatures (20°C/ 68°F and above) we would recommend the use of a glossy top coating.

#### **Technical Specifications**

Pigment Content:	20% +/- 1.5%
Particle Size:	<6 microns (95%)
Solid Content:	46% +/- 2.0%
Solvent:	Water
Supplied Viscosity:	600 – 900 cps

#### **Mixing Instructions**

It is recommended that a mechanical stirrer or similar device be used to mix the product effectively. Never use bead or ball mills to blend the ink parts together. Do not mix with other coating systems.

##### Mixing Ratio:

	% Weight
Part A Clear Lacquer	55.9
Part B Thermochromic Pigment	24.0
Part C Adhesion Promoter	1.1
Water (to be supplied by customer)	19.0

All parts should be mixed in the order above starting with Part A and finishing with water.





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#### **Dilution**

The coating is supplied in a format that once mixed is at spraying viscosity. If required after following mixing instructions above extra water may be added to thin the product. We recommend that the viscosity should stay within the parameters of 25-30 seconds measured on a DIN4 flow cup at 25oC.

#### **Curing**

Curing conditions are as follows: 8 Minutes at 200°C/428°F in a convection oven.

#### **Cleaning Recommendations**

Thermochromic water based ceramic sprayable system should be cleaned using either water or industry standard cleaners. Care must be taken not to contaminate the product with any cleaning solution as this can damage the Thermochromic functionality.

#### **Sensitivity**

##### **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

#### **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.

#### **Storage and Handling**

Thermochromic water based ceramic sprayable system is a 3 part system that will remain stable for 12 months if stored separately away from solvents, sources of UV light and high temperatures, and kept in the original unopened container.

Water Based Sprayable System should be thoroughly mixed prior to application.

Please consult MSDS prior to use.

As the product is water based it is important to keep the containers tightly shut to avoid evaporation and skinning of the product.

Shelf Life of Unmixed Product	12 Months
Shelf Life of Mixed Product	8 Hours

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

#### **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.