Technical Data Sheet

**Thermochromic Screen Inks (Water Based)**
Reversible Temperature Reactive Material

**Thermochromic Screen Inks** (Water based) for absorbent paper and board substrates. Thermochromic Water Based Screen Ink is supplied as an easily mixed 1 part ink 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**
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 matte finish. Therefore, it is always recommended that over laminate or spot varnish is used to give a glossy aspect.

**Printing Recommendations**
**Screen Configuration**
The optimum screen 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 screen is crucial for the desired effect. Using a higher theoretical ink volume will increase the intensity of color of the product when below it’s activation point and also the level of residual color when above it’s activation point.

<table>
<thead>
<tr>
<th>Activated &lt;20°C</th>
<th>Activated &gt;20°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric</td>
<td>Metric</td>
</tr>
<tr>
<td>Recommended Mesh Size</td>
<td>90T</td>
</tr>
<tr>
<td>Minimum Mesh Size</td>
<td>150T</td>
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</tbody>
</table>

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

**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.

**Technical Specifications**
- Pigment Content: 24% +/- 1.5%
- Particle Size: <6 microns (95%)
- Solid Content: 46% +/- 2.0%
- Solvent: Water
- Supplied Viscosity: >15,000 cps

**Cleaning Recommendations**
Thermochromic 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. Use a clean screen free of solvents when printing Thermochromic Water based Screen Ink since the Thermochromic effect can be affected by traces of solvents.

**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.

**Ink Consumption**
Typical ink consumption for Thermochromic Water Based Screen Ink on a 70T mesh is approx 30 – 35 gms per sqm. When obliterating an image, 2 passes may be required.
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**Storage and Handling**
Thermochromic Water Based Screen 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**
An over varnish or laminate is necessary if any resistance to abrasion is required as resistance to pressure is low.

**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. Were 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**
Thermochromatic 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.

**Overprintability/Lamination Properties**
Both heat and cold set laminates can be used with Thermochromic Water Based Screen Inks. Thermochromic Water Based 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 Thermochromic Water Based Screen Inks are overprinted onto a surface pre-printed with offset ink, it is recommended that the offset ink is wax free. For applications where Thermochromic ink activates at cold temperatures (lower than 20°C/68°F), we recommend the use of a matte laminate for optimum visual effect. For inks activated at warm and hot temperatures (20°C/68°F and above), we 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.**
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