



## DATA SHEET

### THERMOCHROMIC OFFSET INK

#### (INCLUDING LITHO, DRY AND UV CURE OFFSET INKS)

#### DESCRIPTION

CTI's Thermochromic Offset inks, are colored below a specific temperature, and change to colorless or to another, lighter color when heated. The color starts to fade with increased temperature at approximately 4° C below the activation temperature and will be in between colors within this temperature range. The temperature above which the ink stops losing color we refer to as the "Clearing Point". The color change is "reversible," i.e., the original color will be restored upon cooling. As the temperature of the ink is lowered from above the Clearing Point, the ink begins to gain color at about 3 C below the clearing point and continues to gain color until full color is achieved. We refer to this as the "Full Color Point". These inks are available in various colors, Clearing Points and Full Color Points. Standard Clearing Points are 15, 31 and 45° C (59, 88 and 113° F). Other activation temperatures are also available, from -5° C to 60° C. See Sales Policies Sheet for a complete list of available colors. CTI's Offset ink is ideal for document security, promotional items, temperature indicating labels, games, novelties, etc.

Thermochromic inks are incompatible with many different chemicals. Please do not put anything into CTI's products without first consulting a CTI representative.

#### TYPICAL PROPERTIES

	<u>Standard Wet Offset</u>	<u>UV Wet Offset</u>
Viscosity (at 25° C)	180-300 poise	110-180 poise
Tack (Initial) at 1,200 rpm/1 min.	8.0-11.0 g*m	10.5-14.0 g*m
Wt. Percent Solids (Approx.)	79%	90%
Wt. Percent Volatiles (Approx.)	<6.4%	<4.2%
Recommended Substrates	Uncoated Paper	Paper, Film
Yield Range (Approx.)	100,000-200,000 in <sup>2</sup> /lb. (depending on film thickness)	

#### SPECIAL CARE & USE INSTRUCTIONS

- Consult Technical Notes for instructions for use.
- CTI's Thermochromic Offset inks are patented, U.S. Patent Nos. 5,591,255 and 5,997,849. Technical notes are available upon signing a confidentiality agreement. Contact CTI for details.
- Run Speed: CTI's Thermochromic Offset ink has been run at 1,400 feet per minute continuously without serious press problems. On certain presses, one may need to stop the press occasionally to clean the blanket, plate or dampeners.
- Four-Color Process: Thermochromic inks cannot be substituted for process colors.
- Carbonless Paper: The ink can be printed on either side of the CB sheet, or on the uncoated side of the CF. In the case of multi-ply, the ink can be printed on the CFB side.

#### STORAGE AND HANDLING

CTI's products should be stored in a cool, dry place and away from sources of UV light. The inks are stable when stored away from heat. The material is combustible and should not be used near open flame. Store Below 80° F. Product must be used within twelve months of purchase. Consult MSDS prior to use.





## **SENSITIVITY**

Thermochromic materials are sensitive to adverse environmental conditions. These are listed below, along with a description of the nature of the sensitivity, and recommendations.

**LIGHT:** Long exposure to UV and some fluorescent lights can degrade color intensity and changing characteristics of the ink. Extreme exposure of more than several days of direct sunlight may degrade the color of the ink. Several hundred hours of strong fluorescent light may cause a loss of color and poor color change characteristics. In handling these materials assume that they are similar to fluorescent pigments in terms of light stability.

**HEAT:** Extended exposure to 100° F or higher, can degrade the color change and intensity of the product. Exposure to extreme heat only has an effect if a given temperature is constantly maintained for a given amount of time. If a printed piece were left in an environment where it remained at 100° F for many days, one might then expect to see a reduction in color. At 400° F the time to degradation might be less than an hour. The effect is time and temperature dependent.

**CHEMICALS:** Thermochromic materials are sensitive to certain chemicals. Since it is unlikely that the printed piece will come into contact with damaging chemicals under normal conditions, this is not a serious concern. The wet ink should not come into contact with any solvents, including wash-up solvents. Be sure that the press is clean and dry before adding CTI's product to it to minimize chemical exposure. Never add solvents to our ink without first speaking with a CTI representative.

**CONCLUSION:** The ink in both wet and printed forms should be stored in a cool, dry place, away from chemicals and direct light, especially sunlight. Wet ink should be used within twelve months of receiving it.

**HYSTERESIS:** Reversible thermochromics exhibit what is referred to as "hysteresis" or "thermal memory". If a standard 31C ink is raised to an extreme temperature, then left to cool under normal ambient conditions, the ink may not achieve its full color, even after it reaches room temperature. Once exposed to this kind of temperature "spike," one may need to lower the ink's temperature to below 20° F below the clearing temperature to gain improved behavior. **ALL APPLICATIONS USING CTI's INKS SHOULD BE THOROUGHLY TESTED PRIOR TO APPROVAL FOR PRODUCTION.**

For further information or assistance, please contact Chromatic Technologies, Inc. at (888) 294-4CTI.

**DISCLAIMER:** The information and data contained herein are believed to be accurate and reliable; however, it is the user's responsibility to determine suitability of use. Since CTI cannot know all of the applications for the product, or the conditions of use, it makes no warranties concerning the fitness or suitability of its products for a particular use or purpose. Thoroughly test any proposed application of our products and independently conclude satisfactory performance in your application. If the application of the products requires government approval, it is the users responsibility to obtain it. CTI warrants only that its products will meet its specifications. There is no warranty of merchantability or fitness for use, nor any other express or implied warranty. The user's exclusive remedy and CTI's sole liability is limited to refund of the purchase price or replacement of any product shown to be out of claimed specifications. CTI will not be liable for incidental or consequential damages of any kind. Suggestions of uses should not be taken as inducements to infringe any patents.

