DATA SHEET

THERMOCHROMIC UV FLEXOGRAPHIC INK

DESCRIPTION

CTI's Thermochromic UV flexographic inks, are colored below a specific temperature, and change to colorless or to another, lighter color as they are 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 about 6 C below the clearing point. 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 65° C. See Sales Policies Sheet for a complete list of available colors. CTI's UV Flexographic ink is ideal for document security, promotional items, temperature indicating labels, packaging, games, novelties, etc. Thermochromic inks are not compatible with many different chemicals. Please do not put anything into CTI's products without first consulting a CTI representative.

TYPICAL PROPERTIES

Viscosity (at 25° C, #3 Zahn Cup)	65-100 sec
Density (Approx.)	9.0 lb./gal
Appearance	Viscous Liquid
Percent Solids (Approx.)	99%
Percent Volatiles (Approx.)	<1%
Yield Range (Approx.)	10,000-75,000 in^2/lb. (depending on film thickness)
Recommended Substrates	Paper, Film

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.

SPECIAL CARE INSTRUCTIONS

CTI's flexo ink is simple to use, but different from other UV Flexo inks. Those differences are outlined below. The instructions should be followed carefully to achieve optimum results. One of the main objectives is to maximize the coating weight. Thermochromic ink by its nature is a low color intensity ink. The coating weight must therefore be maximized for a given application. If you have your own techniques for increasing coating weight, you may try them.

- Use the smallest anilox number possible. It should be lower than 350. An anilox of below 150 is recommended where high color is desired.
- Compatibility of ink, coating and stock must be determined prior to production runs.
- Use a hard sticky-back.
- Use rubber plates with soft durometer.
- Use very little nip pressure.

- Use a doctor blade instead of a metering roller. If the doctor blade is metallic, be sure the anilox used with the doctor blade is ceramic. This doesn't necessarily improve the coating weight, but does improve the print quality.
- The viscosity of the formulations varies slightly between colors and will be on the high side. The results achieved using this thicker ink will be superior to lower viscosity thermochromic inks. You may reduce the ink if desired, but CTI cannot warrantee it once it has been altered.
- The volume of the cells should be as high as possible.
- Clean up with regular solvent, but DO NOT allow the unused ink to come in contact with the solvent. Be sure the press is dry before adding any ink to it. Whatever comes in contact with the ink can potentially harm it.

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 40° 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. Please do not add anything 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

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