

## USING SSC200 TEMPERATURE-SENSITIVE LIQUID CRYSTAL SCREEN INKS

### GENERAL INFORMATION AND NOTES

- a) The SSC200 series screen inks contain microencapsulated cholesteric TLC mixtures.
- b) SSC200 inks are water-based and have been developed for application to clear polyester substrates, but can also be applied to paper and card.
- c) As with all TLC color change effects, the colors shown by SSC200 inks are best visualized against a dark (preferably black) background. SSC200 inks should, therefore, be backed by black (or very dark) backgrounds.
- d) TLC inks are not scratch resistant or stable in UV light, and there will always be a need to protect them. The best method of protection is a clear heat applied overlamine, with low to no plasticizers and preferably strong UV absorbing properties and the TLC inks should ideally be dry before it is applied. It should be noted that if the temperature setting of the laminating machine is too high then damage can be done to the TLC's and it is therefore necessary to run a short test before running the complete job. The surface finish of the dry TLC inks is important to the quality of the color change images obtained and the use of a clear overlamine might also offer benefits in this respect. Also in some cases an overcoat or varnish can be used (again with UV absorbing properties) however care needs to be taken as many of these contain products harmful to TLC's and therefore again tests should always be carried out in advance to check suitability.
- e) As indicated in (c) and (d) above, additional coatings/inks (blacks, clear overcoats, etc.) will need to be used in conjunction with SSC200 TLC inks to produce a finished product or acceptable effect. Such coatings, which may or may not be in direct contact with the SSC200 ink, should be water based or fully cured UV. Materials containing volatile solvents should be avoided. **Tests for compatibility with TLC's should always be carried out before hand as even some "water based" inks can contain unsuitable components.**
- f) At the time of printing SSC200 TLC inks, **the use of volatile organic solvents (like those commonly used in screen printing - ketones, esters, etc.) should be avoided.** These can penetrate the microcapsule wall and interact with the TLC mixture inside changing (and eventually destroying) the color reflecting properties. The interactions likely to occur between the TLC ink and any materials used with it to produce color change effects must always be considered. The color change properties of TLCs are produced by a very delicate and sensitive arrangement of molecules, and it is very easy to change/destroy them without realizing.
- g) Coating thickness is an important variable for TLC inks. The color change properties of inks containing microencapsulated TLC mixtures are dependent on the thickness of ink deposited. Generally, for inks containing microencapsulated cholesteric TLC mixtures (like the SSC200 series), the thicker the coat, the lower and the onset of color (red start). Too thick a coating often results in the normally bright colors appearing slightly milky, more noticeably at the red end of the spectrum. For SSC200 inks, wet film thicknesses of around 150-300 microns (6-12 mil. approx.) which dry to approximately 50-100 microns (2-4 mil.) are recommended. Optimized coating thicknesses depend on the actual printing conditions used.

## PRINTING CONDITIONS

### General Environment

SSC200 Inks must be printed and dried in a completely SOLVENT-FREE environment. The sensitivity of TLCs to oils, UV light and monomers used in UV inks should also be considered. See notes d) and f).

### Machine

Hand or automatic screen process (rotary or flat-bed), sheet or web-fed

### Squeegee

Medium or medium-hard (65 durometer); rounded edge, or to suit substrate

### Screen

Monofilament polyester, 100-150 threads/inch (40-60 threads/cm), 2 wet passes. Coverage of approximately 12,000 sq. in per Kilo (based on 2 coats – 4 passes total) should be achievable and should also give bright colors.

### Stencil

Water resistant emulsion or capillary film; **test compatibility with liquid crystal ink first.**

### Thinning

Deionized or distilled water only. The use of an atomizer spraying distilled water onto the screen periodically during a print run to replenish lost water is also recommended. When thinning or adding more ink to the screen, be sure to mix thoroughly before proceeding

### Drying

Rack or forced air. Temperatures up to about 90°C can be used although lower temperatures (60-65°C) are recommended. When possible, apply heat from below, with gradually increasing temperatures. Maximum water-resistance will not be achieved for several hours.

### Cleaning up

Reclaim as much ink as possible from the screen and store for possible re-working and re-use. Wash up thoroughly with hot water. Dried ink may be difficult to remove and a general purpose (solvent) screen cleaner may be necessary.

### Storage

Store at ambient temperatures (20-25°C) out of direct sunlight, preferably in the dark. The inks may separate to a small extent on standing for prolonged periods and should be mixed until homogeneous. If stored correctly, SSC100 coatings have a useful shelf-life of at least 6 months and are guaranteed for this period of time when unopened.

**Note:** The information in this data sheet (and otherwise supplied to users) is based on our general experience and is given in good faith. **It is the user's responsibility to evaluate the feasibility of using the SSC200 inks by carrying out tests under actual production conditions before proceeding with a print run.**