

## **General Guideline for using *Liquid Crystal Resources* SPN Sprayable Liquid Crystal Coating**

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- **A versatile coating formulated to give the brightest colors possible when sprayed**
- **Good adhesion to most surfaces**
- **Matte or gloss finishes are achievable by varying the coating thickness**
- **Can be removed by washing with water**

### **GENERAL INFORMATION AND NOTES**

- a) The use of SPN coatings overcomes many of the problems associated with using unsealed Liquid Crystal (LC) mixtures, although the reflected colors are slightly less bright. Applied as a thin film, the coatings will dry to a finish that will resist light abrasion.
- b) SPN coatings can be sprayed onto the surface under study. They are of particular use when the surface is not flat.
- c) Surfaces must be black, or painted black, before the SPN coating is applied. As the coating is water-based, the surface and/or black paint applied to it must have water resistance. Any black coating should be completely dry before being covered by the SPN coating. Some black paints or coatings that contain volatile low molecular weight components may interfere with the color play of the SPN. The use of water-based blacks is recommended, and SPN-compatible black backing paints are available from LCR.
- d) As with all LC applications, the better the incident lighting the brighter the colors reflected by the LC. However, the use of incandescent lamps too close to the LC coated surface should be avoided, as the materials are sensitive to UV light, and the color play properties will change on prolonged exposure.
- e) The colors observed depend not only on temperature, but also on the angles of illumination and observation relative to the coated surface. In practice, a LC coated surface should be viewed and illuminated in a direction normal to it. The colors shown by SPN coatings have less angular dependence than unsealed LC mixtures, although the effect can still be noticeable.
- f) The finished surface of the SPN coating is very important to the quality of color images obtained. Coating thickness is an important variable as color plays of SPN coatings can be dependent on thickness of lay-down. Generally, the thicker the coat, the lower the onset of color. Too thick a coating often results in the normally bright colors appearing milky, more noticeably at the red end of the spectrum.

## **USAGE INSTRUCTIONS FOR SPN LC COATING**

1. **Clean surface thoroughly** to remove all dirt, grease, fingerprints, etc. Acetone, petroleum ether, and other common organic solvents may be used. Ensure that the surface is completely dry before proceeding.
2. **Coat surface black.** If the surface is already black, or sufficiently dark, the SPN coating may be applied directly. A black water-based paint (SPBB or WRSPBB) is available which will dry in 30-45 minutes when sprayed through a good quality compressed gas sprayer like an artist's airbrush. Applying the black paint by brush is not recommended, as uneven coatings affect the thermal response properties of the LC. The black coating must be dry before the SPN coating is applied. Drying can be accelerated by gently blowing with warm air.
3. **Apply the SPN Coating.** The following instructions are a guide to provide the user with a starting point from which to optimize the application techniques (coating thickness, etc.) specific to their needs.
  - I. Spray through an airbrush from approximately 6-8" (15-20cm) above substrate surface.
  - ii. Air brush pressure = 20 psi (approximately).
  - iii. Drying times at 20-25°C (68-77°F) are approximately 30-45 minutes, depending on coating thickness. This can be accelerated by gently blowing warm air onto the coating.
  - iv. The depth of coating applied will alter the surface texture of the dried coating. Thin coats will be matte and slightly rough. Thicker coats will flow together to a greater extent than thin ones, giving smoother gloss finishes. The combination of coating depth and surface texture will affect the brightness and shade of the colors produced and may also, to a small extent, affect the temperatures at which each color appears.
  - v. Optimum dry film thickness is around 10 microns (0.4 mils). To achieve this, a total wet film thickness of around 100 microns (4 mils) will need to be applied. Best results are likely to be achieved by building up the coating gradually, drying between applications.
  - vi. 250 grams should be adequate to cover 2.5 m<sup>2</sup> (25 ft<sup>2</sup>).
4. The SPN coating is now ready for use. The color play should be checked and calibrated if necessary. For optimum performance, the general notes overleaf should be consulted, particularly (e) and (f). Prolonged exposure to temperatures in excess of 70°C should be avoided if possible.
5. **Cleaning Up:** The SPN coating and black undercoat paint can be washed off with water. A hot, soapy wash will normally remove both.
6. **Storage:** SPN coatings should be stored in a refrigerator (5-10°C (40-50°F)), but **MUST NOT BE FROZEN**. It may be necessary to allow a warming-up period before applying the materials, as the flow properties of the coating are designed for optimum performance at around room temperature (20-25°C (68-77°F)). Surfaces coated with SPN coatings should be stored well out of reach of UV light, and in a solvent-free environment; ideally no stress should be applied to the coated surface. The color play response should be checked at regular intervals to ensure that no loss of calibration has occurred. If stored correctly, SPN coatings have a useful shelf life of at least 6 months.