

## TLC COATED POLYESTER SHEETS

### STANDARD PRODUCTS

Standard sheets use a substrate of 100 micron clear polyester film (Mylar). The sheets are printed on one side, first with the microencapsulated TLC coating, then with a black backing ink. The color change properties of the TLC coating are viewed through the clear, uncoated side of the sheet. Standard sheets are available with, or without, adhesive-backing (pressure-sensitive adhesive); the protective release-liner can be removed for easy adhesion to a variety of flat surfaces. Standard size is 12 in x 12 in (30cm x 30cm) and the color plays held as standard stock items are set out in the table below.

### SPECIFICATIONS

Substrate: Polyester sheet, 100 microns thick  
 Size: 12 in x 12 in (30cm x 30cm)  
 Total thickness: Without adhesive: 100-175 microns; with adhesive: 175-225 microns  
 Color Change: Black to red, through the other colors of the visible spectrum to blue, with increasing temperature, and finally to black again.

Color Play	Red Start (Black to red) °C	Green Start °C	Blue Start °C	Clearing Point (Blue to Black) °C	Bandwidth (Blue start minus red start) °C
R20C5W	20.0	21.0	25.0	41.0	5.0
R25C5W	25.0	26.0	30.0	44.0	5.0
R30C5W	30.0	31.0	35.0	46.0	5.0
R35C1W	35.0	35.2	36.0	49.0	1.0
R35C5W	35.0	36.0	40.0	49.0	5.0
R40C5W	40.0	41.0	45.0	52.0	5.0

### TOLERANCES

For C5W sheets, Red start temperatures are  $\pm 1.5^{\circ}\text{C}$  and the bandwidth is  $\pm 1^{\circ}\text{C}$   
 For C1W sheets, Red start temperatures are  $\pm 1^{\circ}\text{C}$  and the bandwidth is  $\pm 0.2^{\circ}\text{C}$

For example; for R25C5W, the red start can be between 24 and 26 °C: if the red start is 24 °C, the blue start will be between 28 and 30 °C and if the red start is 26 °C, the blue start will be between 30 and 32 °C. Likewise, for R35C1W, the red start can be between 34.5 and 35.5 °C: if the red start is 34.5 °C, the blue start will be between 35.3 and 35.7 °C and if the red start is 35.5 °C, the blue start will be between 36.3 and 36.7 °C.

### CUSTOM MANUFACTURE

In addition to the standard range of sheets, LCR HALLCREST offers a custom-manufacturing service, tailor-making products to customer requirements. A wide range of substrates can be used, both rigid and flexible, with different thicknesses. Specific problems, like UV stability and water-resistance, for example, can also be addressed.

**GUIDELINES FOR USE**

1. Clean surface thoroughly to remove all dirt, grease, etc. Acetone, petroleum ether and similar organic solvents may be used. Ensure that the surface is *completely* dry before proceeding.
2. Remove protective backing from adhesive and place sheet lightly in position on surface. Press down firmly with fingers in center of sheet and smooth outward, in each direction in turn, to ensure that no air bubbles are trapped between the sheet and the surface.

**REMOVAL**

After use, the sheet can be removed from the surface by pulling it off, although the sheet will be probably destroyed in the process. Residual adhesive can be removed by washing with a suitable solvent. The choice of solvent will depend on the nature of the surface to which the sheet was attached.

**STORAGE**

Unused sheets should be stored out of direct sunlight at room temperature (20-25°C), in a solvent-free environment. Sheets in position on test surfaces should be protected from UV light and organic solvents wherever possible. The color play properties of the sheets should be checked at regular intervals. If stored correctly, the sheets should have a shelf life of up to a year or more.

**LIFETIMES**

TLC coated sheets should retain their color play characteristics for many months under normal handling conditions. Continued submersion and temperature cycling in hot (50°C+) water baths will accelerate degradation, as will continued temperature cycling at elevated temperatures in general, and exposure to UV light.

**SIMPLE EXPERIMENTS FOR STANDARD PRODUCTS**

1. Dampen the tip of a small cloth or sponge with water and "write" with it on the surface of the R20C5W sheet. The evaporative cooling that takes place will cause color changes.
2. Place the R20C5W film in a refrigerator and observe the change in colors (from blue to green to red to black). Remove it from the refrigerator and observe the reverse order of color changes as the temperature rises (from black to red to green to blue). In the winter time, a window pane may also be used to cool the film.
3. Using the R25C5W and R30C5W sheets, you can determine the relative hand temperatures of a group of people. Due to variations in blood circulation, a wide range of temperature results may be obtained in the group. Even though normal body temperature is 37°C, you will note immediately that skin temperatures fluctuate considerably from this value. Should a person not be able to cause a color reaction, even on the R25C5W, move the sheet away from the fingertips to the wrist area. You will eventually find a warmer temperature.

These simple experiments are designed as an introduction to the usefulness of TLC products. The materials have many applications, not only in testing, but also in industry, medicine and the home.

Note: As with all TLC applications, the better the incident lighting, the brighter the colors reflected by the TLC. However, the use of incandescent lamps too close to the TLC sheet should be avoided, as the materials are sensitive to UV light and the color play properties will change on prolonged exposure.