

## Digi-Temp Reversible Thermochromic Liquid Crystal Thermometers

### Reversible Temperature Indicators

#### *What They Are:*

These self adhesive labels consist of a series of temperature-sensitive elements containing microencapsulated **Thermochromic Liquid Crystal** TLC coated on a black backing. Each element changes color distinctly as its rated temperature is reached, passing through the colors of the spectrum in sequence (Orange, Yellow, Green, and Blue before turning black at a higher temperature. The TLC strips are calibrated so that the indicator that shows green indicates the actual temperature. The color changes are reversible and the reflected colors will be observed in the reverse order upon cooling.

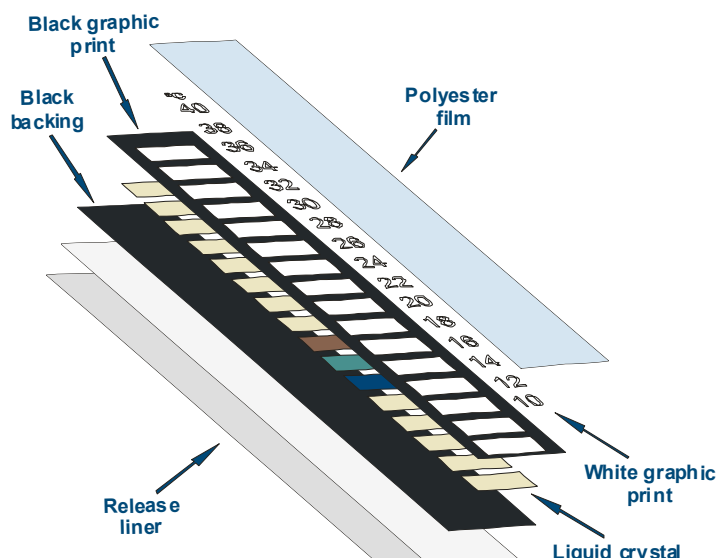
#### *How the labels work:*

The temperature-sensitive elements contain TLC molecules that are very sensitive to temperature and change position / twist in relation to changes in temperature. This change in molecular structure affects the wavelengths of light that are absorbed and reflected by the liquid crystals, resulting in an apparent change in the color of each temperature event.

When the rated temperature of an indicator is reached the TLC molecules twist slightly causing the TLC substance to absorb the red and blue portions of the visible light and reflect the green part. This causes the temperature event to appear green. When the temperature decreases, the molecules begin to twist in the opposite direction, and the TLC reflect a different portion of the spectrum.

#### *Label Construction:*

<u>Component:</u>	<u>Thickness</u>
Polyester film	>75, 125, 175 $\mu$ (Depending on label type)
Graphic Print	10-20 $\mu$
Liquid Crystal Ink	10-50 $\mu$
Black Backing	10-20 $\mu$
Adhesive & carrier	150-180 $\mu$
Release Liner	75 $\mu$

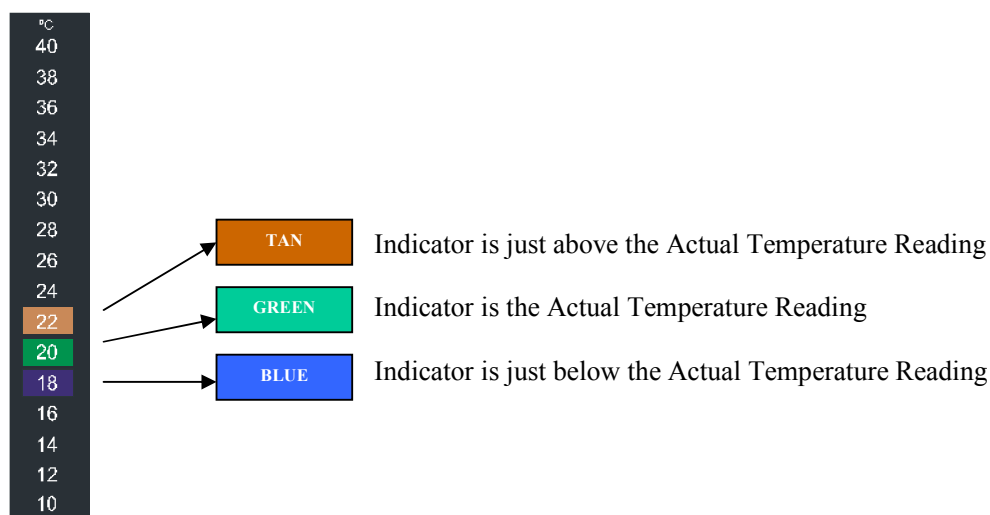


Above values are general guides using the standard products as a representative example.

Adhesive Tape	Double-coated Adhesive Tape
Covering Film	Polyester 5 mil stock
Color Change Material	Non toxic mixture of liquid crystal esters
Accuracy	- 30 to 59°C ±1°C 60 to 89°C ±2°C 90 to 120°C ±3°C
Shelf Life	12 months from invoice date when stored at room temperature (i.e. 21°C (70°F) & 50% relative humidity).

## Reading TLC Thermometers:

The correct temperature is indicated by the square on the TLC thermometer that turns green. If green is not visible the temperature will be mid way between the indicators that are illuminated tan and blue as follows:



Please note the above colors are a guide for demonstration purposes and the actual colors observed could be slightly different depending on label type.

## Custom Products:

In addition to the standard **Digi-Temp** labels available, which cover the temperature range of -30 - 120°C, a full custom manufacturing service is available and products can be manufactured to meet customers' precise requirements of, for example, size, shape, color, temperature range, number of temperature elements, graphic printing (logo's etc). Please ask for details.