MICROENCAPSULATED TLC SLURRIES (SLN40 SERIES)

Pigments for use in the manufacture of temperature-sensitive color change coatings

Temperature-sensitive color change tracer particles for use in fluid flow field studies

SLURRIES FOR COATING MANUFACTURE

TLCs can be used as color change pigments in the form of microencapsulated slurries in water. The products are available as 40% (weight) solids content with microcapsule diameters centered in the range 10-15 microns. They are custom formulated to the required color change properties. These slurries can be used to make sprayable TLC coatings by addition to aqueous binders. They are designated by the product code SLN40 followed by the color play (e.g. SLN40/R35C1W).

TRACER PARTICLES FOR FLUID FLOW STUDIES

In the microencapsulated slurry form, TLCs can also be readily used as tracer particles in fluid flow studies. An optimized microcapsule diameter range for such products has been determined to be 50-100 microns, and products with microcapsule diameter distributions in this range are recommended for this type of application. Other microcapsule diameter distributions can be made to order. Again, 40% is the preferred solids content.

CUSTOM MANUFACTURE

All microencapsulated slurries are manufactured to order. They can be tailor-made to customer requirements of, for example, color change properties, microcapsule diameter distribution and solids content. For most common applications where average capsule diameters are between 10 and 100 microns, the preferred solids content is 40%, but products with higher and lower solids levels can be made.

PACK SIZES

100g, 250g and 500g

Note: Since all slurries are manufactured to order, 100g is the minimum order quantity.

GUIDELINES FOR USE AS TRACER PARTICLES

1. Some simple tests need to be carried out before proceeding.

   i) **The compatibility of the carrier fluid must be determined**. This can be done by adding some TLC slurry to a small sample of the carrier fluid and checking the stability of the color play response with time. The color-temperature response should be stable for the duration of the study.

   ii) **The optimum doping level should be evaluated**. This will depend on the nature of the study. As a starting guide, a doping level between 0.01 and 0.1% is recommended. However, it may be that the optimized level falls outside this range.

2. The TLC slurry can be added directly to the carrier fluid. The composition of the slurry provided (40% capsule solids) should be borne in mind throughout to keep check on the doping levels. Alternatively, the slurry can be filtered before use if the carrier is not 100% water, and the excess water in the slurry is not required. A note of the amount of water removed should always be kept for doping level calculations to be made accurately. Because the doping levels are relatively low (a 50 liter tank will only require approximately 65ml slurry (40% capsule solids) to dope to a level of 0.05% capsules), it may be easier to add the slurry/microcapsules to a small sample of the carrier fluid 1:1 and then add this to the remainder of the carrier.

3. For optimum performance, refer to the general notes below, particularly (a), (d) and (e).

STORAGE

Microencapsulated slurries should be stored in a refrigerator (5-10^{o}C) when not in use - DO NOT FREEZE.
If stored correctly, the materials should have shelf lives of at least 6 months.

NOTES:

a) **Studies should always be carried out against a dark, preferably black background.**

b) **The interactions likely to occur between the TLC 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 and even destroy them.**

c) **The carrier fluids must be aqueous. Recommended fluids include water, glycerol, ethylene glycol, and other similar low molecular weight polyhydric alcohols. Using mixtures of such highly hydroxylated materials with water, it is possible to produce a range of carrier fluids with a variety of viscosities to suit most applications**.

d) **The colors observed depend not only on temperature, but also on the angles of illumination and observation. Color play specifications supplied with materials have been calibrated using a technique with both incident and reflected light normal to the surface of a thin film of TLC. In the use of the materials as tracer particles in fluids, illumination and viewing are generally not carried out from the same direction, and the observed color change properties will probably be different to those supplied in the materials specification. In addition, TLCs have different properties when suspended as droplets in bulk fluids as opposed to their use in thin films on solid surfaces. Therefore, it may be necessary for the user to recalibrate the color play properties of the materials to suit the particular method of use.**

e) **As with all TLC applications, the better the illumination, the brighter the colors reflected by the TLC. However, the use of incandescent lamps close to the materials should be avoided if possible, as the materials are sensitive to UV light, and the color play properties will change on prolonged exposure. Color temperature profiles should be checked at regular intervals to ensure that no shift has occurred.**