PHYSICAL TESTING SERVICE - PARTICLE SIZE ANALYSIS

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Most of the products which we encountered daily are homogeneous mixtures of chemical species dispersed at a molecular level. Some of these particles are so small that they are invisible to our naked eyes. For example, a microemulsion solution appears to be clear and colourless. Some of the examples of dispersion of particles, which we normally encountered in our daily life, are milk and paint. Milk is actually dispersion of fat in an aqueous phase while ink or paint is dispersion of solid particles (pigments) in a liquid medium. And the list goes on.

WHY IS PARTICLE SIZE IMPORTANT?

Particle size is important for the improvement of product performance. For example, the time taken for a drug to release depends very much on the particle size of drug. Larger particles take longer time to release than smaller ones. Particle size also determines the product appearance. For example, in a liquid foundation, whether matt finish or shiny finish depend on the size of the titanium dioxide particles. Particle size also determines the emulsion stability thus affects the product shelf life. Larger particles tend to settle more quickly than smaller ones and this will lead to sedimentation.

HOW CAN WE MEASURE PARTICLE SIZE?

Particle size can be measured using a Malvern Mastersizer or a HPPS (high performance particle sizer). Malvern Mastersizer (*Figure 1*) measures particle size from 0.02 – 2000 mm while HPPS measures particle from 0.6 nm to 6000 nm hydrodynamic diameter.

Figure 1. Malvern Mastersizer.

Malvern Mastersizer uses light scattering technique to measure the particle size and then uses the Mie theory to obtain the size of various particles. The key point of the theory is that each size of the particle will have its own scattering pattern, which means if you know the size of the particle and other details of the structure, you can accurately predict the way it scatters the light. The Mastersizer works backward by using the optical unit to capture the actual scattering pattern from a field of particles. Then using the theory to calculate the size of particles.

HPPS uses the dynamic light scattering to measures Brownian motion and relates this to particle size. It does this by illuminating the particles with a laser and analysing the intensity fluctuations of the scattering light. An important feature for HPPS is that it uses the relationship between the size of a particle and its speed due to Brownian motion to obtain the particle size and this relationship is defined in the Stokes-Einstein equation.

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SERVICES OFFERED BY PHYSICAL TESTING LABORATORY

- Particle size by Malvern Mastersizer (normal emulsion)
- Particle size by HPPS (microemulsion)

Sample Volume Required
50 ml.

WHEN TO EXPECT FOR RESULTS

Under normal circumstances, client can expect to receive report within three weeks. In case of unforeseen circumstances, client will be informed.

REPORTS

A test report will be sent to client together with the data printout from the instrument where it is applicable. Example of data printout is shown in *Figure 2*.

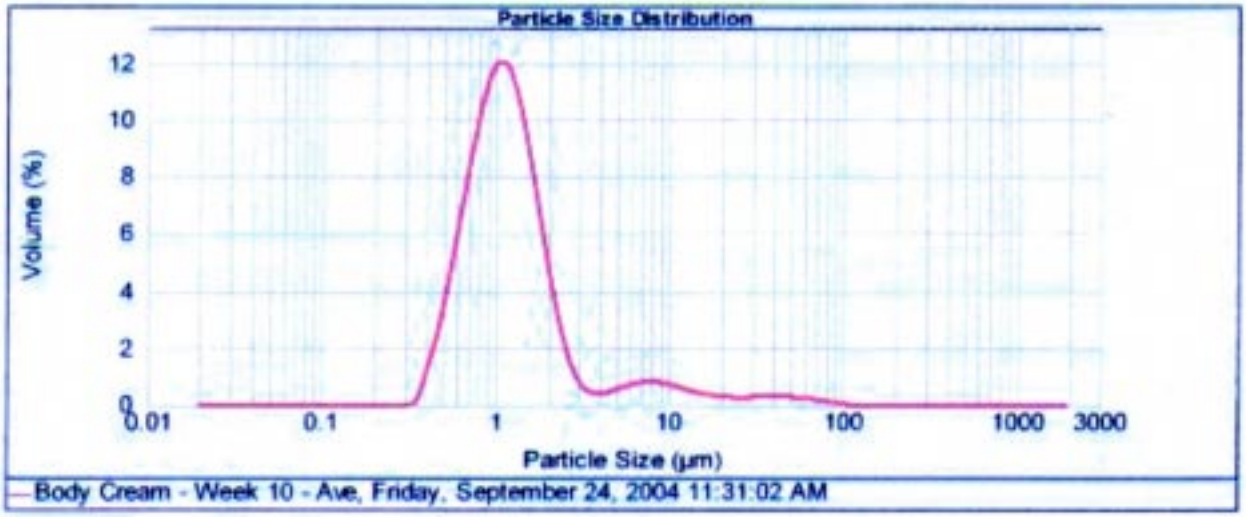

Figure 2. An example of particle size distribution measured using Malvern Mastersizer.

For more information kindly contact:

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