Equipment Name: Malvern Mastersizer 2000	**Category:** **C. Particle Characterisation in and ex-situ and/or** **Institute: University of Leeds** **Location: ParticlesCIC, Engineering Building, Leeds. LS2 9JT. UK** **Contact Details of Technology Expert:** **Name, Susanne Patel** **Phone, +44 113 3432378** **Fax, +44 1133432377** **E-mail k.s.patel@leeds.ac.uki**

Short technology description/Overview *(approx 300 words)*:

Particle size and particle size distribution of wide range of particles from ~100 nanometres to mm's. Samples can be measured wet or dry, but for nanoparticulates then wet is the only dispersant we will consider.

Method

Prior to analysis, the dispersion cell is filled with clean, deionised water and left to allow thermal equilibrium to take place. The instrument automatically aligns so that the incident path of the laser is aligned with the optical arrays. The cleanliness of the system is then checked, and a background is taken. By comparing the signal intensity of the system without a sample present, to the intensity with a sample, the obscuration of the laser beam may be calculated, giving some idea of the material concentration in the dispersal cell. Too high a concentration results in multiple scattering, too low and the signal strength is inadequate to register at the detectors.
Suitable dispersion procedures should be followed to ensure that the powder is dispersed and minimum agglomeration has taken place. Care must also be taken to ensure that the dispersal cell contains no air bubbles or that particle fracture is not occurring as the instrument is not capable of distinguishing between agglomerates, air bubbles or primary particles.

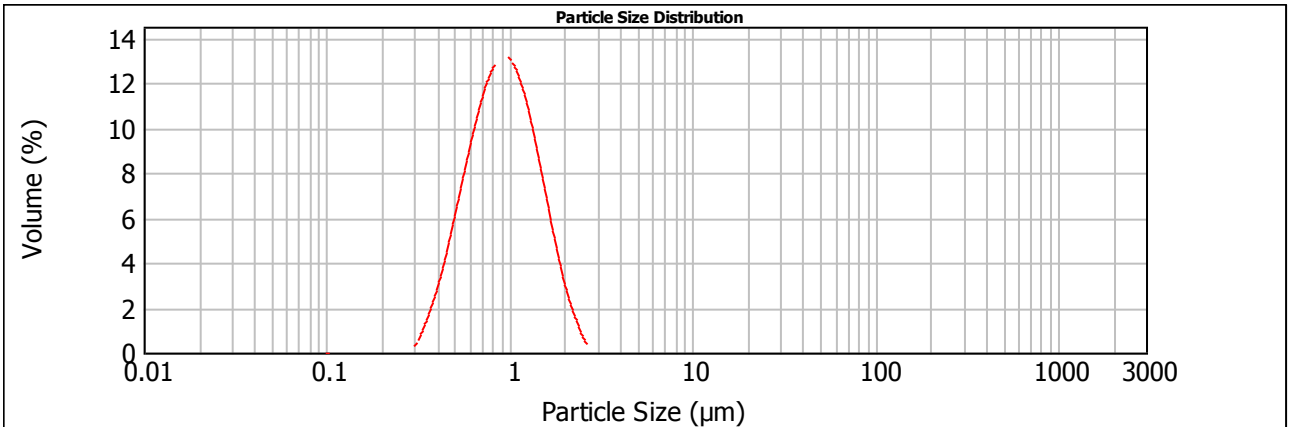
Sonification is an option to aid particle dispersion although again, care must be taken to ensure the correct intensity and duration of sonification to avoid primary particle breakage.
The particle size distribution will depend on the optical model used to calculate it! The real and imaginary components of the refractive index are a vital part of the particle characterisation equation. In the case of an unknown particle refractive index (if a literature value is unavailable), the optical properties may be derived by varying the input values and comparing the resultant scatter pattern with the measured data until a good fit is obtained.

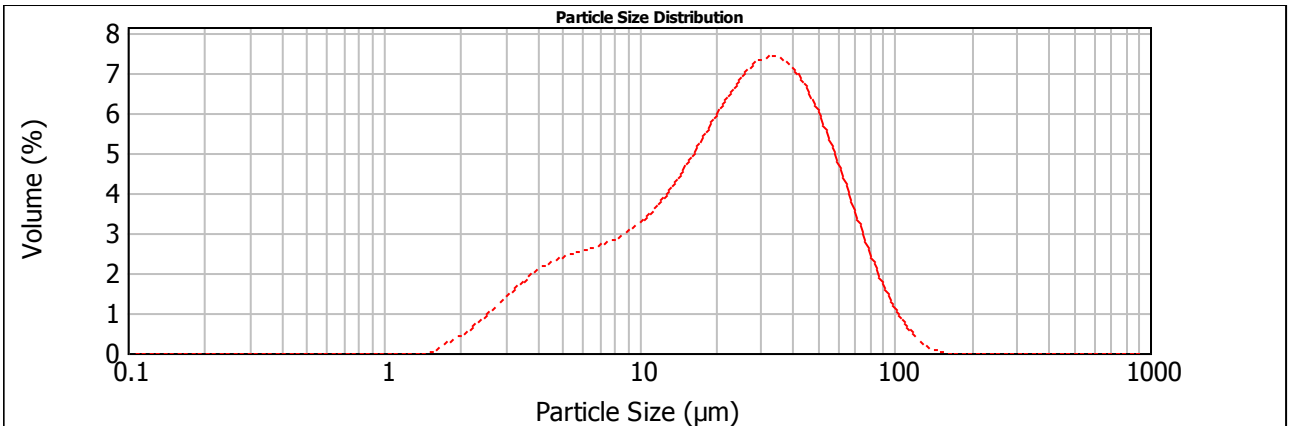
Main Features (Equipment Capabilities):

- Sample size is dependent on concentration
- Wet measurement (aqueous or non-aqueous)
- Very common technique with good statistics

Typical Samples & Images:

Below are some typical particle size distributions measured on the Mastersizer 2000





Any further Information: