Business Unit
Technology

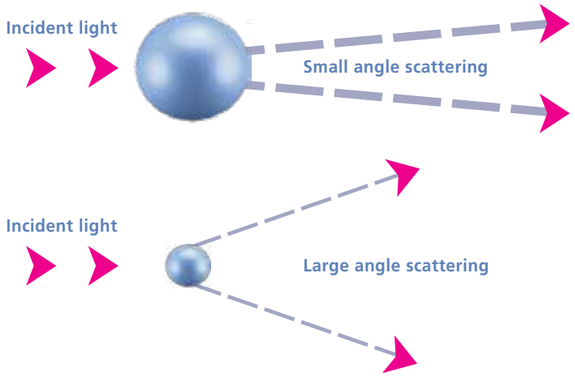
Particle Size Analysis - The Laser Diffraction Technique

Malvern

Laser diffraction, a widely used particle sizing technique for materials ranging from hundreds of nanometers up to several millimeters in size measures particle size distributions by measuring the angular variation in intensity of light scattered as a laser beam passes through dispersed particulate sample.

Laser diffraction analysis is based on the theory of Fraunhofer diffraction, which states that the intensity and angle of the light scattered by a particle is directly proportional to the size of the particle.

Scattering of light from small and large particles



The substance being examined is passed through the laser, and the diffracted light focused onto a detector which measures the angular distribution of the intensity of the scattered light.

The main reasons for its success

- **Wide dynamic range -** from submicron to the millimeter size
- Rapid measurements - results generated in less than a minute
- **Repeatability -** large numbers of particles are sampled in each
- **Instant feedback -** monitor and control the particle dispersion
- **High sample throughput -** hundreds of measurements per day
- **Calibration not necessary -** easily verified using standard reference materials
- **Well established technique -** covered by ISO13320 (2009)

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Particle size analysis using laser diffraction from Malvern instruments

The Mastersizer 3000 laser diffraction particle size analyzer delivers rapid, accurate particle size distributions for both wet and dry dispersions with the minimum of effort. Measuring over the nanometer to millimeter particle size ranges, it packs exceptional performance into the smallest of footprints, bringing operator-independent measurements that every user can rely on.

The Mastersizer 3000 is the latest generation of the world's most popular particle sizing instrument. Incorporating expert engineering and applications know-how into every stage of its design.

Sample dispersion accessories for the Mastersizer 3000

Aero S
Dry sample dispersion
A new state-of-the-art dry powder dispersion accessory for dispersing cohesive, fragile and robust powders with ease.

Hydro MV / LV
Wet sample dispersion
A large and medium volume automated dispersion unit which is design for different sample availability and dispersants

Hydro EV
Wet sample dispersion
A unique dip-in wet sample dispersion unit that can be used with standard laboratory glassware. Suitable for a wide variety of dispersant volumes and particle size ranges.

Hydro SM
Wet sample dispersion
The Hydro SM is a cost effective wet sample dispersion unit designed for measuring samples in non-aqueous dispersants where solvent usage needs to be minimized.