



SEDIGRAPH III 5120

TECHNIQUE OVERVIEW

Mass The SediGraph III uses a narrow, horizontally collimated beam of X-rays to measure directly the relative mass concentration of particles in the liquid medium. This is done by first measuring the intensity of a reference X-ray beam which is projected through the clear liquid medium prior to the introduction of the sample. A homogeneously dispersed mixture of solid sample and liquid is next circulated through the cell. The solid particles absorb some of the X-ray energy, which again is measured, this time to establish a value for full scale attenuation. Agitation of the mixture is ceased and the dispersion is allowed to settle while X-ray intensity is monitored. During the sedimentation process, the largest particles are first to fall below the measuring level, and each mass measurement represents the cumulative mass fraction of the remaining fine particles. Gradually, finer and finer particles settle out, ultimately clearing the measuring zone of suspended particles and allowing the X-ray beam to again pass through the cell unattenuated.

Size / Settling Velocity The SediGraph determines particle size from velocity measurements by applying Stokes law under the known conditions of liquid density and viscosity and particle density. Settling velocity is determined at each relative mass measurement from knowledge of the distance the X-ray beam is from the top of the sample cell and the time at which the mass measurement was taken. From the velocity equals distance divided by time relationship, it can be determined the maximum velocity of all particles remaining above the measurement zone, these velocities being associated with the finer particles. A sequence of closely-spaced measurements provides a distribution of mass fraction remaining in suspension versus velocity or size class or, as more commonly termed, cumulative mass percent finer.