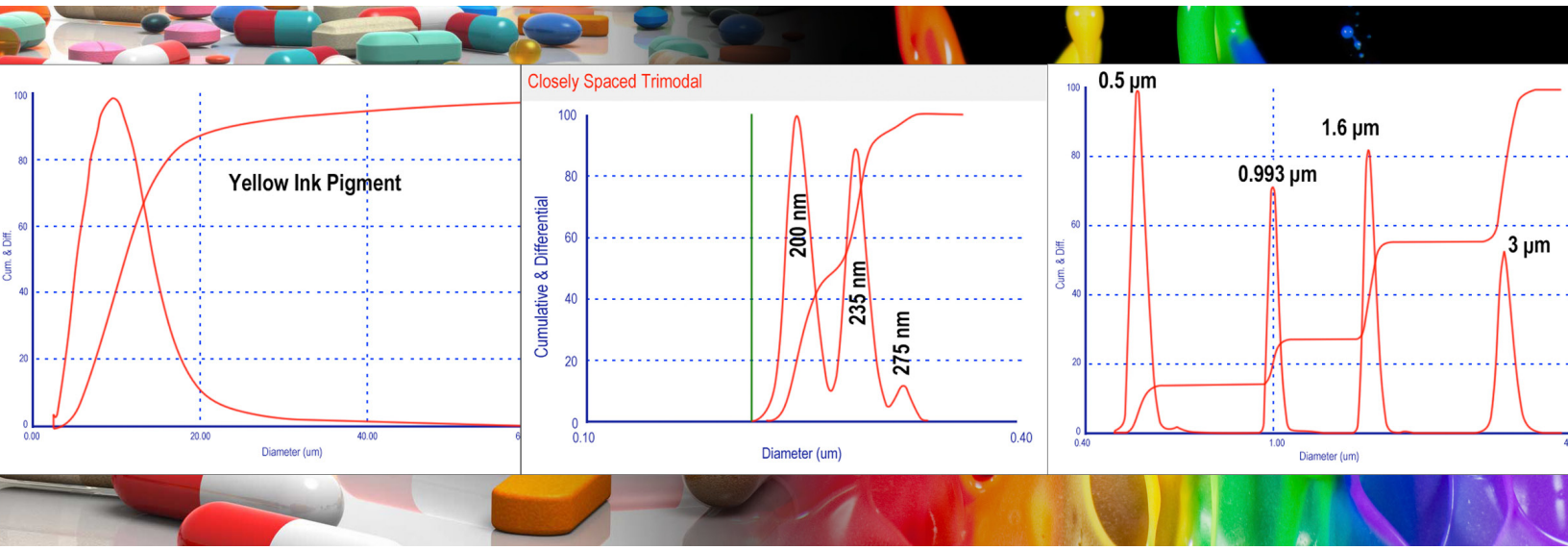
Brookhaven Instruments

Nanoparticle, Protein, & Polymer Characterization

Brookhaven's BI-DCP High Resolution Particle Sizing



Based on first principle, the **Brookhaven Instrument BI-DCP** is the only optical disc centrifuge that measures particle size without calibration. **The high resolution instrument can resolve peaks as close as a 13% size differential and quantify distribution accurately.** Two possible methods, homogenous or line start.

- Polystyrene Latex
- Nanodispersions
- Carbon blacks/furnace blacks
- PLGA shell – drug delivery
- Ink particulates
- Metal oxides and refractories
- Protein-loaded microcapsules
- Coated latex
- Paints and coatings
- Encapsulated systems
- Pharmaceuticals, cosmetics, foods

Based on the principle of photosedimentation, the BI-DCP measures the size of particles according to the time the particle takes to sediment in the detector according to Stokes law. High resolution measurements are obtained typically in 5 to 30 minutes. Modeling software is included to predict optimal experimental conditions like disc speed and run time. The instrument can work in line start where the sample is injected on the spinning fluid or the simpler method of homogenous start where all the sample is loaded in the disc and spun. Either method results in high resolution measurements of your particles. No other type of instrument can resolve several peaks in the difficult range around 1 micron. Quantitative calculation of weight distribution is achieved if the extinction coefficient is known. For material with unknown extinction coefficients, the size is still measured accurately. The BI-DCP is a great alternative/orthogonal method.

	BI-DCP	Competition
Gradient	A simple gradient is produced with water usually with a little ethanol. This gradient concentration is so low, that water data can be used for calculation.	Six (6) different densities needs to be prepared for the gradient. This can be quite tedious to prepare.
Run conditions	An included modeling utility is used to determine operating conditions (speed, volumes, time) without advance tests.	Calibrant has to have same properties (e.g density) as sample which often is not possible to find in research where reference material is not available. Calibration is an extra run that consumes time.
Size calculation	Absolute, based on first principle. No calibration needed, the time it takes to fall is used to calculate the size.	The system is calibrated with size standards. The unknown size is calculated by size comparison with standard.
Method	Line Start (injection on top of spinning fluid) or simple homogenous start (all the sample is introduced then spun).	Line Start method only, no possibility of homogenous start for large samples.
Negative density	Homogenous start allows negative relative density ($\Delta\rho$) measurements (particle less dense than the fluid).	Not possible!
Mass distribution	Red light for Mie scattering. Mie scattering correction only necessary for mass distribution, not for size measurement itself.	Impossible, non-quantitative results only.

Specifications

Analysis	Size range of 0.005 to 30 µm maximum; 0.05 to 10 µm typical for low density particles, 0.005 to 2 µm for high density particles; wide variety of materials dispersed in water and other solvents
Software	Windows XP, Windows 7 or Windows 8
Instrument	Microprocessor controlled digitally driven electric motor. Digital readout for setting and monitoring speed. Speed continuously variable from 500 to 15,000 rpm. Speed accuracy and stability better than + 0.01%. Temperature sensor and digital readout. Dual purpose integral strobe.
Disc Cavity	Polymethylmethacrylate with stainless steel hub. Dynamically balanced over range of rotational speeds. Spin fluid volume from 10 to 40 mL.
Power Requirements	100/115 VAC, 220/240 VAC, 50/60 Hz, 1,000 Watts
Dimensions	260 x 500 x 550 mm (HWD)
Weight	33 kg
Certifications	CE Marked

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