Nicomp® DLS/ZLS Nanoparticle Size Analyzer

The Nicomp dynamic light scattering (DLS) system measures size and zeta potential of nano sized particles from 0.3 nm to 10 µm. The backbone of the Nicomp DLS system is a proprietary high resolution multimodal deconvolution algorithm that can resolve close bimodal distributions. More importantly, it can separate the native peak of a distribution from the aggregate tail allowing researchers to determine the size of the native population. This is a critical parameter when trying to develop materials where the native population is directly responsible for the final properties of a product. The figures to the right show how low resolution results found in a Gaussian distribution can be very misleading compared to the Nicomp multimodal results.

The Nicomp DLS instrumentation is engineered using a modular design approach. This allows for semi customization of the instruments based on the customers application needs.

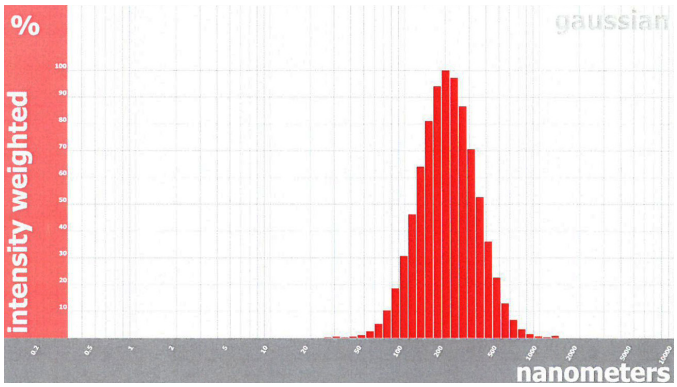

Figure 1.

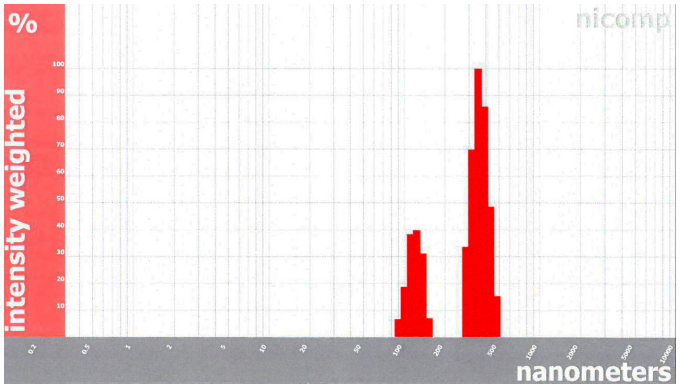

Figure 2.

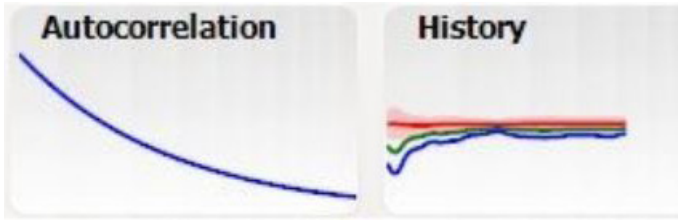

Figure 3.

STANDARD NICOMP FEATURES

- Nicomp high resolution multi modal algorithm.
- Baseline adjust for automatic aggregate compensation.
- Multiple sample cells including a 1 cm cuvette and 6mm culture tubes that are low volume and can be centrifuged to remove contaminates.
- Time history plot provides a visual display of when adequate scattering data is collected to ensure statistically valid results.
- Vesicle Weighting – provides a light scattering correction for analysis of unilamellar vesicles.

OPTIONAL FEATURES

- **Autodilution**[Pat.] – eliminates the need for manual dilution of concentrated samples up to 40% solids. Provides more precise dilutions to the optimal measuring concentration resulting in higher reproducibility. It is the enabling technology for automation; batch autosampler and online measurements.
- **Multi-Angle Goniometer** – utilizes a precision stepper motor coupled with an optical fiber to provide multi angle sizing from approximately 12 – 175 degrees. Ideal for advanced users with complex distributions in the Mie regime that are looking to focus in on parts of their distribution.
- **High Power Laser Diodes** – 15 – 100 mW red, 20 – 100 mW green provide adequate scattering for ultra-small particles below 20 nm and low scattering materials avoiding without the need to compromise the measurement by over concentrating the sample which leads to multiple scattering and particle interaction effects.
- **Avalanche Photo Diode Detector** – provides a high sensitivity detector for low concentration and low scattering samples. Up to 7x gain over a standard photomultiplier tube and when coupled with a higher power laser diode enables accurate sizing information for sub 1 nm particles.
- **Low Volume Cells** – index matched sample cells for analysis of samples volumes down to 10 microliters. Ideal for expensive protein and macromolecules used in life science applications.
- **Autosampler/Online** – by incorporating the auto dilution feature in the Nicomp which can handle samples with up to 40% solids, the measurement can be extended into a batch auto sampler platform for automated QC analysis of up to 96 samples sequentially and even be combined with a proprietary sample capturing fluidics module which allows for inline measurements of a process line.

ZETA POTENTIAL ANALYSIS

Zeta potential is the measure of the charge density surrounding the surface of particles or emulsion droplets. The charge density surrounding the particle is directly related to the stability of the suspension or dispersion. The higher the values indicate a more stable system. The most common use of zeta potential is in the formulation stage of suspensions and emulsions. Researches use the values of native particle size and zeta potential to develop systems that provide the desired properties of the final product.

STANDARD ZETA FEATURES

- **Phase Analysis Light Scattering**[Pat.] – utilizing a DSP based PALS technique to measure small doppler shifts in the phase of the light scattered from a suspension allowing you to determine the zeta potential in high ionic strength or high dielectric environments (organics).
- **Frequency Analysis Mode** – provides a frequency domain zeta measurement. This is very useful in obtaining distribution information on the mean zeta potential value as well as a great tool for providing information on the system alignment in service mode.
- **Dip Cell Electrodes** – these electrodes can be dipped directly into a disposable cuvette which provides for a uniform electric field between the electrode pair, eliminating the need for the stationary plane determination. These electrodes are made from a rugged palladium tip design which provides a durable dip cell design that has a long-life cycle.
- **High Voltage Zeta Potential Cell** – measures at higher electric field strengths (up to 250V/cm) in organic solvents.
- **Electric Field Strength Compensation** – Constant current mode that compensates for fall in the electric field during a sample analysis.
- **Polarization Correction** – provides a correction for the polarization effects in the Phase Analysis Mode PALS to provide an accurate zeta potential value.

TECHNICAL SPECIFICATIONS

Particle size range	0.3 nm – 10 µm
Minimum concentration	0.1 mg/mL lysozyme
Maximum concentration	40% w/v
Size analysis types	Gaussian and Nicomp high resolution multi-modal with ability to split peaks separated by 1.5 × in size (220 and 340 nm)
Measurement angles	90° standard or 10° – 175° multi-angle goniometer includes high concentration backscatter
Detectors	PMT standard, optional 7x gain APD
Light adjustment	Light intensity automatically controlled using a neutral density filter
Temperature range	0 to 90°C
Zeta potential analysis	Frequency analysis and phase analysis light scattering (PALS)
Zeta potential	±500 mV (theoretical) for particles 0.3 nm – 100 µm
Conductivity	10^{-5} S/m – 0.2 S/m (for zeta potential only)
Zeta cells	Aqueous dip cell standard, optional organic dip cell, 1 – 2.5 mL volume
Molecular weight	Single angle, using Mark-Houwink equation, or Debye plot using external spreadsheet
Pharmaceutical options	21 CFR part 11 software, validation documents
Physical	43 cm (W 17") × 61 cm (D 24") × 25 cm (H 10"), 28 kg (62 lbs) standard, can vary with options
Power	100 – 120 VAC, 60 Hz or 220 – 240 VAC, 50 Hz
Modular options	Auto-dilution, auto-sampler, on-line

Note: Specifications are sample dependent and subject to change without notice.

FOR MORE INFORMATION

Please call your Regional Customer Service Center today to learn what Entegris can do for you.
Visit entegris.com and select the Contact Us link to find the customer service center nearest you.

TERMS AND CONDITIONS OF SALE

All purchases are subject to Entegris' Terms and Conditions of Sale. To view and print this information, visit entegris.com and select the Terms & Conditions link in the footer.

Entegris

Corporate Headquarters
129 Concord Road
Billerica, MA 01821
USA

Customer Service
Tel +1 952 556 4181
Fax +1 952 556 8022
Toll Free 800 394 4083