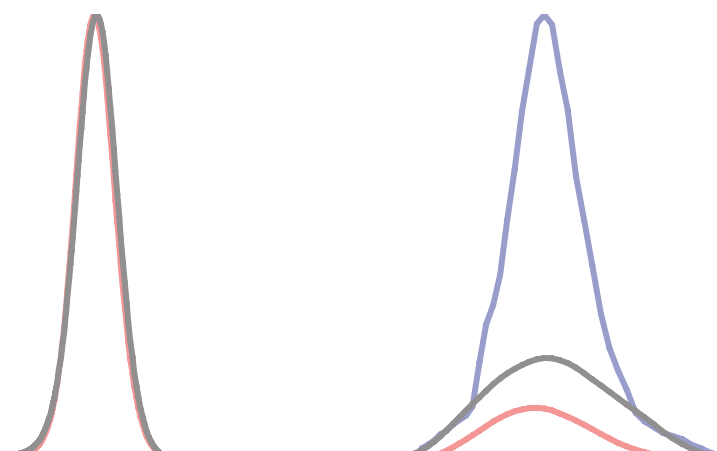


Zeta Potential (Particle Size Analyzer)



EPC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

Analytical Technologies Limited

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>> How It Works....

The Zeta combines acoustic attenuation spectroscopy and electro-acoustics in order to produce simultaneously particle size distribution (PSD) and Zeta potential (ZP), as well as, percent solids data without the need for sample dilution. The Zeta also measures sound speed spectra, pH, conductivity, and temperature of samples in the particle size range of 5 nm to 100 microns.

- By combining Acoustic-Attenuation Spectroscopy and Electroacoustic techniques, simultaneous Particle Size Distribution (PSD), and Zeta Potential (ZP) measurements are made without the need for sample dilution which avoids errors, is faster and simpler and does not change the sample's actual PSD and/or ZP.
- Simultaneous measurement of Percent Solids, pH, Conductivity, Temperature, Sound-Attenuation and Speed Spectra.
- Patented PSD algorithm does not require users to guess or know a priori the sample's PSD shape, e.g., Gaussian, lognormal, unimodal, bimodal, etc.
- Wide particle size range of analysis: 5 nm to over 100 microns.
- Zeta Potential Range: +/-450 mV
- Mobility Range: +/- 18 $\mu\text{cm/Vs}$
- Particle Size range (diameter): Minimum 0.50 nm & Maximum 9 μm
- Maximum Concentration: 40% w/v
- Measurements can be made on a wide variety of samples, including aqueous, as well as, non-aqueous samples such as pigments (organic or inorganic), inks, minerals, emulsions, metal oxides, catalysts, nanoparticles, pharmaceuticals, biodispersions, and many others.
- Particle size measurements do not require minimum particle/solvent density difference.
- PSD of samples of low ZP, e.g. near their IEP, can be accurately determined.
- Absolute PSD data is provided. There is no need to calibrate with particle size standards.
- Easy analysis of opaque and/or highly viscous samples.
- On-board sample mixing during measurement that prevents particle settling.
- Ability to pump samples during measurement for easy analysis of highly-viscous samples.
- Automatic PSD (inertia)-based correction on ZP data. This correction is necessary due to particle-inertia effects on ZP measurement.
- Automatic Iso-Electric Point (IEP) determination thanks to its automated Potentiometric and Volumetric Titration capability.
- Patented hardware design provides reliability, and ease of use with minimal maintenance. • Suitable for R&D, Production, and on-line environments, as well as, advanced R&D applications

» Particle Size

As sound travels through a slurry or colloid, it becomes attenuated. The attenuation level is affected by the particle size. The Zeta measures very accurately acoustic attenuation over the 1-100 MHz frequency range. Because sound travels through most media, Zeta acoustic attenuation measurements can be made on high-concentration and/or opaque samples. Particle settling is not a problem since samples can be stirred or pumped during the measurement.

Zeta sample analysis is quick and easy without requiring particle dilution which is time consuming, error prone, and may alter the actual sample PSD. Simply pour, or pump if so desired, your sample in the Zeta sample cell and the Zeta intuitive software does the rest in less than 10 minutes.

The Zeta uses software developed and patented to calculate detailed PSD data without the need for assumptions regarding the PSD shape. Typically, ensemble-type instruments require that either the software or the operator assume or guess whether the PSD is unimodal, bimodal, lognormal or Gaussian. Such assumptions render the data unreliable.

The Zeta innovative patented hardware design simplifies operation while minimizing maintenance. This platform is thus suitable for R&D, as well as, repetitive QC measurements. The Zeta is also ideal for process online operation.

» Zeta Potential

The Zeta measures Zeta potential by the Electrokinetic Sonic Amplitude (ESA) Electro-acoustic method invented and patented by ATL Applied Sciences. ESA, which does not need to use optical/laser means, consists of applying a highfrequency electric field to the sample and measuring the resulting sound wave amplitude and phase angle.

The ESA measurement is being used worldwide, in both academic and industrial institutions, for the measurement of a wide variety of opaque, translucent, aqueous, and non-aqueous samples without the need to perform sample dilution. ESA applications include QC/Plant/R&D automated Iso-Electric Point (IEP) determination (used in conjunction with the ESA automatic titrator), surfactant/dispersant/flocculant effect studies, surface modifications, core-shell systems, and many others.

» Applications....

The Zeta can be used in a wide range of R&D, as well as, industrial production environments. Examples include:

Nanoparticles, Semiconductor Chemical Mechanical Polishin (CMP) slurries -detect wafer-scratching oversize particles directly, or determine the actual slurry detailed PSD for CMP-performance monitoring-, Ceramics, Inks, Emulsion stability, O/W and W/O, Pharmaceuticals, Biocolloids, Light Phosphors, Organic and Inorganic Pigments such as TiO₂ and Carbon Black, Catalysts, Minerals, and many others.

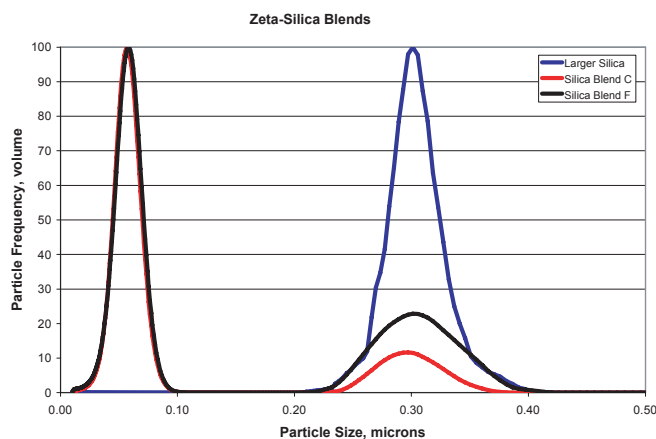
» Software....

The Zeta software incorporates twenty years of instrument design experience. Perform a particle size analysis with a simple mouse click. Powerful graphics allow you to compare data directly. Zeta data files can be readily imported into popular spreadsheet software such as Microsoft Excel for further analysis.

The Zeta can be used in repetitive QC analysis settings without requiring highly trained operators. Additionally, advanced research can be conducted thanks to the Zeta powerful data analysis capabilities.

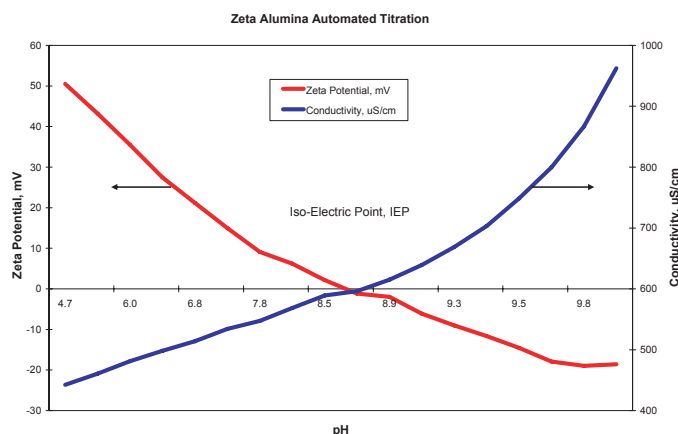
» The Figure At The Top

shows overlaid Zeta PSD plots from three silica samples. The black and red curves represent blends of a 60 nm and a 300 nm silica samples. The Zeta data accurately shows the different 60/300 nm particle ratios. The blue curve corresponds to a 300 nm sample by itself.



» The Figure At The Bottom

shows an example of an automatic, unattended potentiometric titration of an alumina sample. Its IEP location is readily determined by the Zeta instrument.



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HPLC Servicing	:HPLC Servicing : We have team of service engineers who can attend to any make of HPLC promptly @the most affordable cost.
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