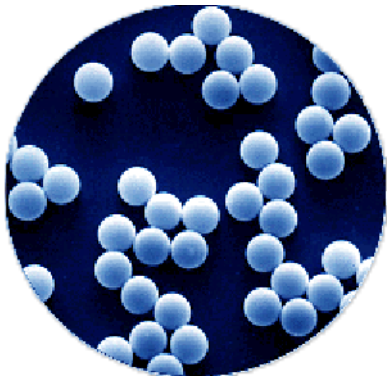
Brookhaven Instruments Corporation

MicroBrook Eyetech

Particle Size, Shape, and Concentration Analyzer

Particle Sizing

Particle Shape



Particle Concentration

Particle Sizing | Particle Shape | Particle Concentration

NOVA INSTRUMENTS

MicroBrook Eyetech

Particle Size, Shape, and Concentration Analyzer

Features & Concept

- Monitor kinetic processes
- Plot multi-dimensional data by jotting size against shape
- Analyze complex data to reveal secondary distributions
- Identify individual particles in the distribution
- Generate standard volume and number distribution results
- Fast & Accurate particle size analysis with the unique Laser Obscuration Time technique.
- Accurate description of non-spherical materials with sophisticated Dynamic Image Analysis
- Results are independent of physical or optical properties

Rapid, Reliable, and Accurate Analysis

The MicroBrook Eyetech shines a new light on particle sizing, bringing size, shape, and concentration data together to form a blue print of your particle system.

What's Inside

- 21 CFR Part 11 Compliant
- Range: 0.1 µm to 3600 µm
- High Resolution 5 MP USB 3.0 CMOS Camera
- 2 mW HeNe, 632.8 nm laser
- Compact bench top unit, USB connection

User Friendly Interface

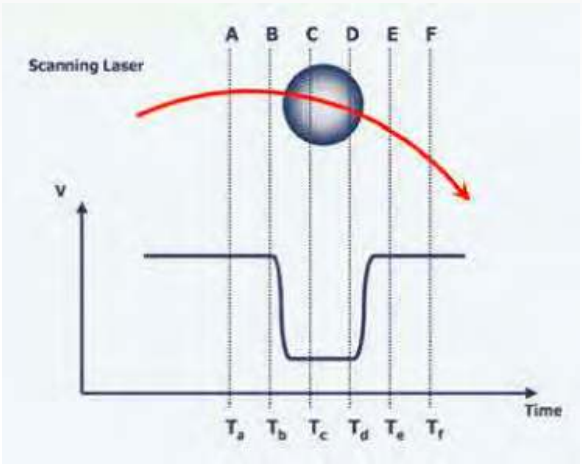
The comprehensive information that is generated by laser and video analysis, is easily accessible by intuitive data reporting software. Results can be displayed in a large variety of tables and graphs that can be customized to show exactly the information that is required. Data comparison is made easy by the data mining feature, which allows overlay graphs and comparison tables to be compiled. With a click of the mouse, a sample report is generated and includes information about sample preparation, size, and shape results, and is completed with images or video of the sample.

- Automated report generation
- Customized real-time graphs and tables
- Easy data comparison with overlay graphs and comparison tables

Principles of Operation

The laser channel determines particle size by analyzing the interaction of the laser beam into a narrow spot. This spot is rotated by a wedge prism so that the beam describes a narrow circular motion in the sample zone. When the laser beam interacts with a particle in its path, a photo diode detects the duration of the temporary blockage of the laser beam by the particle. The time of obscuration is directly related to the chord-length of the particle that interacted with the laser beam, where larger particles affect a longer obscuration duration than smaller particles.

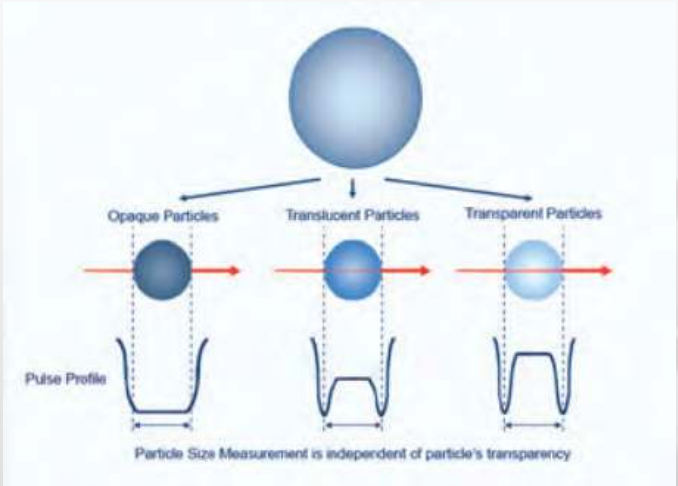
The intensity of the obscuration is not a significant parameter for the Laser Obscuration measurement principle, which means that the measurement is independent of physical or optical properties, unlike other sizing methods where these are required.



During each analysis, the laser beam has millions of interactions with the particles. To measure particle size correctly, the EyeTech distinguishes between on-center and off-center interactions, as only on-center interactions provide information on the particles' true size. This is achieved by filtering the shape of the Pulse Profile. Only pulses with narrow derivatives--the characteristic of a particle that is hit straight on its diameter--are accepted as valid on-center interactions, and subsequently added to the particle size distribution.

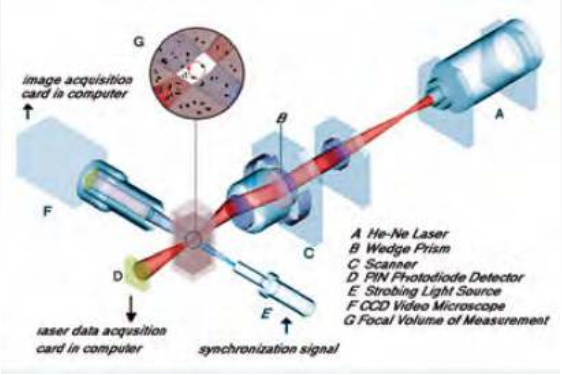
Particle Transparency

Rfc Cwcrcaf k c_qspck clr gqiqgk sjr_l cmsoqjw_aasp_rc dmp`mrf mn_osc _l b rp_l qn_pcl r n_prgajcq gl rfc q_k njc, Mn_osc n_prgajcqm`qaspc rfc j_qcp`c_k amk njcrcjw*qmrfc m`qasp_rgml rgk c gqc_qgwbcrcpk gl cb, ?qrp_l qjsacl r mpqck g#rp_l qn_pcl r n_prgajcq_pc n_prg_jjwbgdbsqc rmrfc j_qcp`c_k *rfcwu gjj n_qqml qmk c jge f r rmrfc bcrcarmppcqsjrgl e gl n_prg_j m`qasp_rgml q, Fmu ever, at the particle boundaries, the detector observes complete obscuration on the edges. The partial transmission of the laser through the center will cause a decreasing signal and a deeper belly towards the baseline of the pulse. Since the pulse intensity is not used for the particle size measurement and the obscuration time between the particle's boundaries can be easily determined, correctly analyzing transparent particles is assured. Therefore, samples with opaque, transparent, or mixtures of particles are measured accurately in a single measurement, independent of transparency.



Combined Laser and Video Channel

- Accurate analysis and characterization of spherical, non-spherical, and elongated particles.
- Simultaneous results of Particle Size, Concentration, and Shape
- Modular design for a range of dry and wet applications
- Real-time visualization of the sample during operation.



Measurement Cells

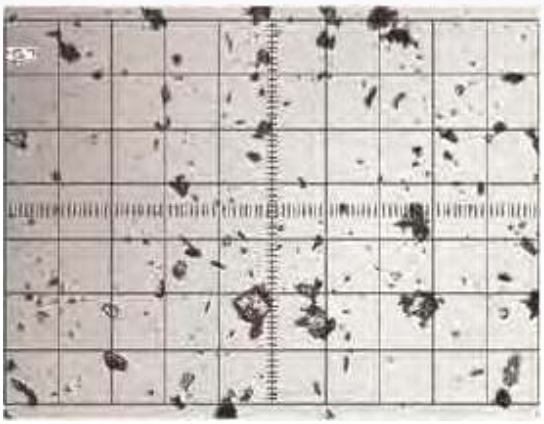
The Eyetech is a modular system that can be fitted with 10 different measurement cells. With a quick change of a measurement cell, this versatile instrument is ready to analyze particles in liquids, emulsions, dry powders, fibers, magnetic particles, heated liquids, and aerosols. This application driven approach ensures your sample is measured according to its specific nature.

- Magnetic Stirring Cell ACM-101
- Mechanical Stirring Cell ACM-102
- Liquid Flow Cell ACM-104A
- Fiber Cell ACM-104L
- Aerosol Flow Cell ACM-106
- Micro Flow Cell ACM-108
- Side Cell ACM-110
- Heated Cell ACM-111
- Free Fall Cell ACM-112

Sample Measurement Capabilities

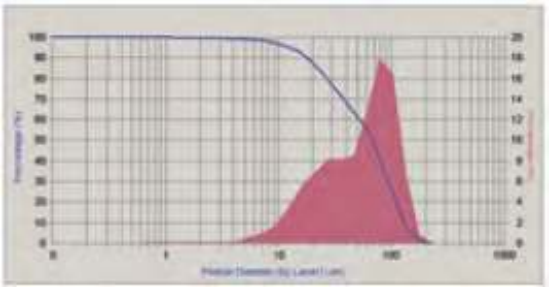
- Wet
- Dry
- Surface
- Airborne

Multi-Dimensional Data Presentation

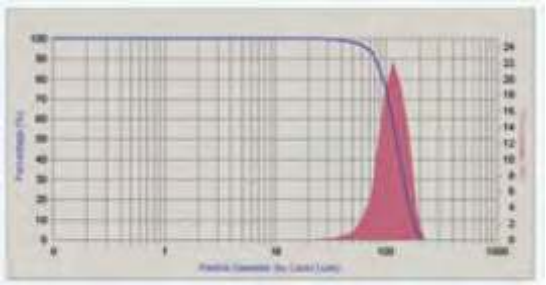


Sample Image

Number Distribution



Volume Distribution



Detection of Minor Fractions

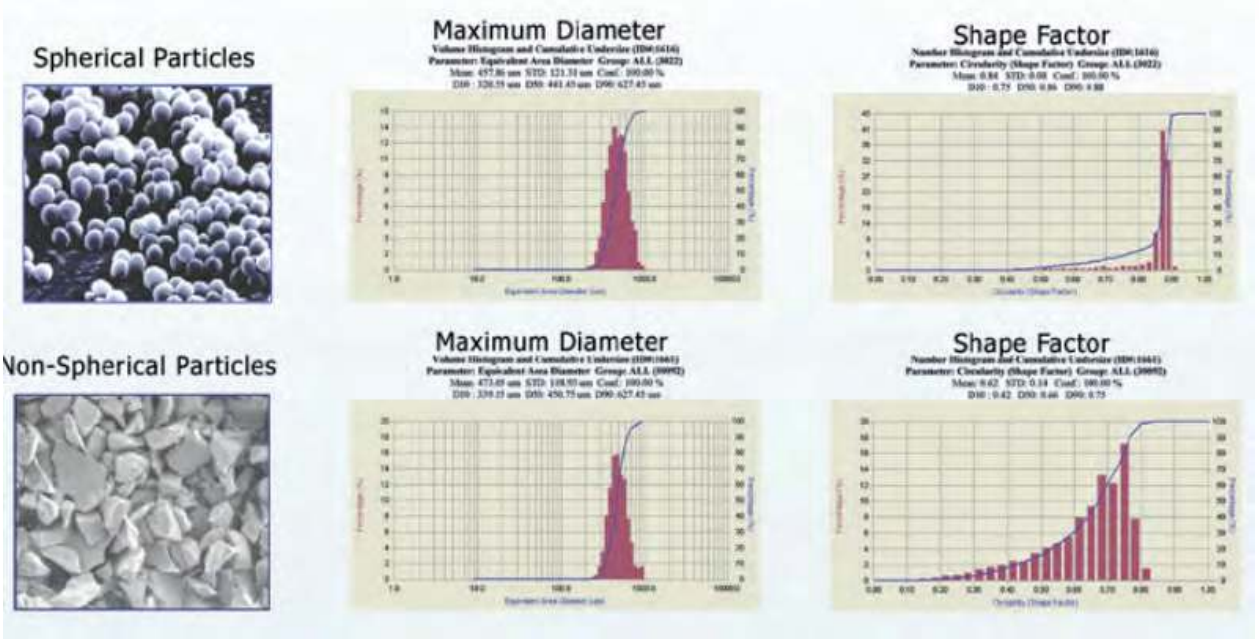
The laser obscuration method has significant advantages for particular applications, such as detecting minor fractions that make up 1% or less of the sample volume, or measuring the fraction of very large particles in a sample with high resolution.

Concentration Measurement

In addition to particle size, the pulses generated by the laser-particle interaction also provide valuable information about particle concentration. The EyeTech records the sum of all particle interactions and since the volume of the rotating laser spot is known, the concentration can then be calculated.

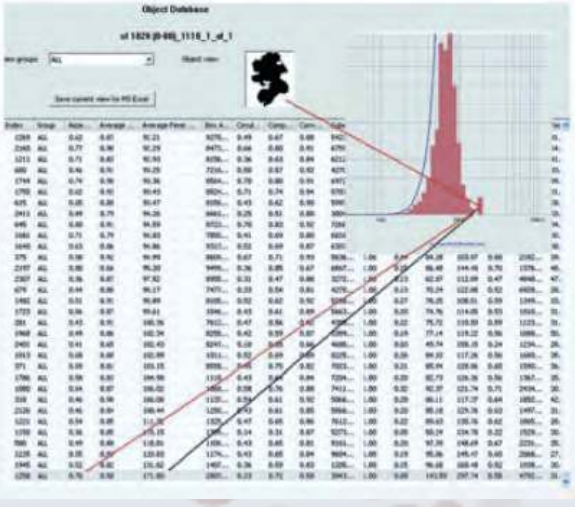
Complementing Size Results with Shape

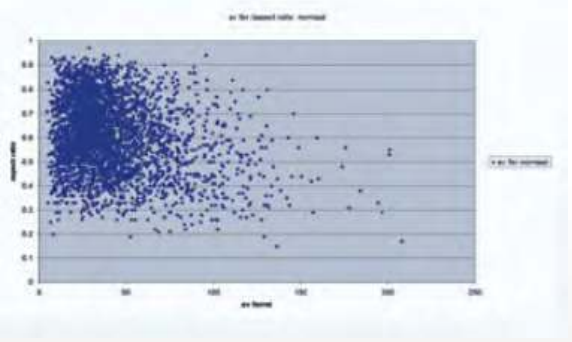
For accurate characterization of non-sperical particles, two -dimensional shape information is essential. Differences in shape may not be reflected in the particle size distribution. Dynamic Image Analysis uses digital video microscopy to capture optimal particle images for processing. Acquired images are processed using sophisticated image analysis procedures and/or are stored for later processing. Complementing size results with shape results adds a second dimension to the particle size distribution data, samples of similar size might have strong variation in shape distribution.



Understanding the Particle System

- Detailed Object Information is available for each and every measured particle, including its image, by a mouse click
- No limitation for the number of particles
- Easy export of the raw data to Excel for further processing.





Shape and size-related data by dynamic image analysis provide a wealth of data on each individual particle, this information can be displayed in scatterplots to examine a sample's particle size versus particle shape trends. The shape filter also has the functionality of an optical filter, allowing the user to zoom in on specific fractions within the sample according to size or shape characteristics.

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Specifications

Sample Type	Particles in liquid, air, or on a surface
Size Range	Sizing: 1 µm to 3600 µm diameter
Modular Measurement Cells	Liquids, emulsions, opaque liquids, dry powders, fibers, magnetic particles, heated liquids, and aerosols
Accessories	Automatic liquid flow controller, powder disperser, powder feeder, temperature controller, aerosol controller
Concentration Range	Up to 10^9 particles per mL (for 1 µm particles)
Measurement Method	Laser Obscuration and Dynamic Imaging Analysis
Illumination & Video	Synchronized Strobe light, adjustable intensity & duration, flash rate up to 30 fps High Resolution 5 MP USB 3.0 CMOS Camera
Standard Laser	2 mW HeNe, 632.8 nm
Laser Resolution	0.33% of full scale, up to 0.2 µm
Detector	Silicone PIN Photodiode Detector
Software	Windows 7 or higher OS
Compliance	ISO compliant
Power Requirements	100-130V, 205-240V, 50/60 Hz, 100VA
Dimensions	665 x 280 x 183 mm
Weight	14 kg

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NOVA INSTRUMENTS

Brookhaven Instruments Corporation

For over 35 years, Brookhaven Instruments has been designing, developing and manufacturing instrumentation for particle characterization. We are a pioneer in correlator design, laser light scattering, electrophoretic light scattering, and particle size instrumentation, and continue to maintain an excellent reputation in the marketplace today.

Our experience throughout the years has instilled a "no-shortcut" philosophy in terms of product design, engineering, and development. These internally intertwined disciplines result in the production of innovative, high-performance yet simple to operate instrumentation. Brookhaven Instruments strives for continuous improvements to maintain our leadership position in providing products with best value and superior performance.

Finally, there is service and support - standards which differentiate Brookhaven Instruments from all the rest. We go beyond providing the very best instrumentation for particle characterization by providing expert technical services, too. With decades of experience in particle characterization, Brookhaven's dedicated staff will provide solutions.

The process begins by helping our customers choose the best instrument for their needs, continues on with proper instruction of instrument operation, and is rounded off by providing first-class after-sales support necessary for complete satisfaction.

Brookhaven is committed to addressing the needs of the scientific marketplace with the highest standards of professional integrity and technical excellence. We look forward to assisting you.

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