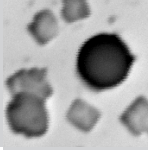
NIST Recommended Practice Guide



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Particle Size Characterization

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Table 1.1.

Particle Size Analysis Instruments Based on Different Physical Principles

Instrumental Technique	Physical Principle	Volume Fraction Range (%)	Size Range(μm)
Acoustic Attenuation Spectroscopy (N) [Ulltrasonic Attenuation Spectroscopy]	ultrasonics	> 1	0.05 to 10
Centrifugal Sedimentation-Optical (E)	sedimentation	ID	0.01 to 30
Centrifugal Sedimentation-X-Ray (E)	sedimentation	ID	0.01 to 100
Electrical Resistance Zone Sensing (E) [Particle Counting, Coulter Counter]	particle counting	< 0.1	0.4 to 1200
Electroacoustic Spectroscopy (N) [Electrokinetic Sonic Amplitude]	ultrasonics	> 1	0.1 to 10
Gas Absorption Surface Area Analysis (E) [BET Absorption]	surface area analysis	NA	NA
Laser Light Diffraction (E) [Static Light Scattering, Mie Scattering, Elastic Light Scattering]	electromagnetic wave interaction and scattering	0.01 to 5	0.04 to 1000
Light Microscopy (E)	particle counting	NA	> 1.0
Quasi-Elastic Light Scattering (E) [Dynamic Light Scattering, Photon Correlation Spectroscopy, Optical Beating Spectroscopy]		<0.005	0.003 to 6
Scanning Electron Microscopy (E)	particle counting	NA	>0.1
X-Ray Gravitational Sedimentation (E)	sedimentation	ID	0.5 to 100
Colloid Vibration Current (N) [Single Frequency]	ultrasonics	> 1	<10
Electrokinetic Sonic Amplitude (N) [single frequency]	ultrasonics	> 1	<10
Microelectrophoresis (E) [Laser Light Scattering, Quasi-Elastic Light Scattering]	electromagnetic wave interaction and scattering	<0.001	0.1 to 1
Sieving (E)	sieving	NA	5 to 100,000

E: Established Technique **N: Emerging Technique** **ID: Instrument Dependent**

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