CHIEF UP INTERNATIONAL CORPORATION

The *Nanotrac* by Microtrac, Inc.

Nanotechnology and Biotechnology Particle Size Measurement Solutions

High Speed and High Efficiency Dynamic Light Scattering

You can now measure particle size distribution in the nanometer and colloidal ranges, without the dilution required by other systems. Microtrac, Inc. has been a pioneer in light scattering particle size technology for 30 years, and introduced the Ultrafine Particle Analyzer in 1990. The newly enhanced and designed Nanotrac, features faster measurements (up to 20 times faster), smaller particle size capability (to 0.8 nm), higher precision, higher accuracy and advanced software capabilities all in one small, robust dynamic light scattering instrument having no moving components.

- **Rapid analysis** – as fast as 15-30 seconds in most cases
- **Design** – No moving parts and simple design means that that there are no parts to wear nor be replaced
- **Chemical compatibility** — Compatible with all organic solvents
- **ISO 13320** — Complies with this ISO standard on particle size measurements for Dynamic Light Scattering
- **Brownian motion analysis** — Advanced power spectrum analysis of Doppler shifts by the Controlled Reference Method, patented by Microtrac, Inc.
- **Temperature control** – Precise temperature monitoring and compensation eliminates need for temperature control baths or devices
- **High concentrations** — This capability can eliminate concern of dilution, a cause of agglomeration or dissolution
- **Low concentrations** – As low as 0.1 ppm @200nm polystyrene
- **Operation simplicity** – No advance knowledge of particle distribution required — just add sample and measure
- **Security** — Software compatible with FDA 21 CFR Part 11 for computer and software security
- **Colored materials** — Avoids multiple wavelength absorption issues
- **Physical size** — Smallest dynamic light scattering footprint available in particle size industry. Also available in a remote probe model for external ("Dip 'N' Run") measurement or for in-line measurement
- **Accuracy** – Mie scattering calculations for spherical particles and proprietary modified Mie calculations for non-spherical particles. Only Microtrac offers this enhanced accuracy for non-spherical particles — the majority of real world materials
- **Range** – Measurement capability from 0.0008 to 6.5 microns satisfies most nanotechnology applications
- **Calibration –** First principle optical physics avoids the need for calibration – verification test kits are available. Alignment is never needed
- **FDA Validation –** Full documentation and personal customer support
- **Small sample size** – Less than 3 ml per sample standard cell, or as small as 0.1 ml with small cell option
- **Traceability** — Particle size measurement traceable to NIST standards
- **Cost effective long term operation** – The probe design avoids cost of expendable cuvettes and pre-cleaning requirements; A background measurement avoids need for ultra clean diluents
- **Applications** — Organic polymers (latex polymers and others), nanometals and other nanoinorganics, proteins, lipoproteins, DNA, and RNA
- **Data presentation** — Accurately report narrow, monomodal, multimodal, and broad range distributions in a variety of statistical formats without the need to select special calculation algorithms
- **Resolution** – Measures monomodal, multimodal, broad and narrow distributions automatically without pre-selecting special programs
- **Consistency** – Features afixed detector and laser design, which delivers repeatability and linearity. High concentration capability avoids agglomeration or dissolution of particles during dilution

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- **Flexibility** — The modular design allows selectable configurations based on your application and can be expanded to meet future needs at any time
- **Electronics** — Advanced, high efficiency electronics for accurate particle size measurements
- **Upgrades** — Prior UPA models can be upgraded depending upon present hardware and software
- **Power demand and safety** — Low power laser provides electric and laser irradiation safety
- **Versatility** – Versions for the lab bench, on-line or even in-line for process control applications
- **Reliability** — Robust, rugged design assures reliable use for many years into the future.

State-of-the-art Technology

The ***Nanotrac*** uses a newer, advanced power spectrum analysis of Doppler shifts to produce a full spectrum of particle sizes provided as a particle size distribution of volume (mass) percent and intensity. While other systems measure the light after it has passed through a sample, and at one or more angles, the Nanotrac uses a reference beam to penetrate the sample very slightly. Light undergoing frequency shifts is collected at a shallow depth to avoid multiple scattering effects. Scattered light caused by interaction with randomly moving particles is mixed with a portion of the original laser after being reflected back into the probe at 180 degrees. The combined light passes through a fiber-optic cable to a single detector, and advanced electronics and software analyze the signals to calculate the Doppler shifts corresponding to particle size. Controlled Reference Method technology, in which mixing of the laser and scattered light occur, provides high signals using low power. Small size semiconductor lasers provide extremely long life and safety. No moving parts and no maintenance assures that the ***Nanotrac*** will reliably provide data for years without concern for repeat service visits. Advanced calculations avoid the ambiguity of polydispersity (PDI) index while providing measured distribution shape.

Condensed *Nanotrac* Specifications

Range and Spec:	0.8 to 6500 nanometers (0.0008 to 6.5 microns)
Repeatability:	1% for 100nm polystyrene
Optics/Alignment:	Fixed laser and detector positions; 780 nm semiconductor laser directed to sample through a fiber optic cable. Alignment of optics never needed
Measurement Angle:	180 degrees
Complete System:	Solid-state optical bench, Pentium IV computer, CRT or flat screen monitor, complete data management software, printer options
Data Handling:	Advanced Microtrac FLEX Software offers unparalleled capability for graphics, data export/import, customized printed reports, and all data handling demands including export to Adobe PDF, as well as other export formats for sharing data over the internet. FLEX software provides data storage in Microsoft Access database format utilizing OLE. Volume, number, area and intensity weighted distributions as well as percentile and other summary data. Data integrity is ensured using **FDA 21CFR Part 11 compliant** security features.
Sample Handling:	Powders, fluids and all particles suspended or suspendable in fluid. Manual transfer and rinsing of sample for *Nanotrac 150.* **Sample size –** Less than 3 ml or as low as 0.1ml with small cell option. **Samples may be measured by dipping probe directly into sample using Nanotrac 250.** Also, automated sample handling and sample changing using the UAC 112
Suspending medium:	Compatible with any organic solvent and most acids and bases generally used to deliver particulate samples
Power Requirements:	90 to 240 VAC, 5 amps, 47/63 Hz, single phase
Dimensions:	Height: 13 in. (33.0 cm); Width: 22 in. (55.9 cm); Depth: 12 in. (30.5 cm) not including computer or UAC 112
Typical Analysis time:	30 to 120 seconds
Delivery Systems:	None required
Mode of operation:	Independent, manual operation or fully automatic control using the UAC 112

For complete information on the Microtrac *Nanotrac,* as well as other Microtrac products, contact Microtrac Inc.. or your local Microtrac representative. Direct to Microtrac, Inc. (**727) 507-9770. Domestic Sales ext 13, International Sales ext 12. Visit the Microtrac World Wide Web site at www.microtrac.com to learn more or to locate your local Microtrac sales representative.**

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