

HORIBA

ADVANCED NANOPARTICLE TRACKING ANALYSIS MADE ACCESSIBLE



ViewSizer™ 1000

MULTI-VARIABLE PULSE
NANOPARTICLE TRACKING ANALYSIS (NTA)

ViewSizer 1000

Measure the Complete Nanoparticle Size Distribution without Compromise

The ViewSizer™ 1000 combines the advantages of multispectral NTA with the simplicity of a single laser system by utilizing multi-variable pulse nanoparticle tracking analysis (MVP NTA).



Achieving efficient, repeatable, reproducible, and accurate measurements of nanoparticles size distribution and concentration remains a challenge for complex samples, such as extracellular vesicles (EVs), ultra-fine bubbles, liposomes, viruses, proteins, and colloids. Light scattering techniques, such as laser diffraction and dynamic light scattering (DLS) yield fast and accurate average size, but details are lost due to their ensemble nature.

Nanoparticle tracking analysis (NTA) overcomes this limitation by analyzing individual particles. The ViewSizer 1000, driven by MVP NTA, offers a new patented approach that overcomes these issues without the complexity of multispectral NTA.

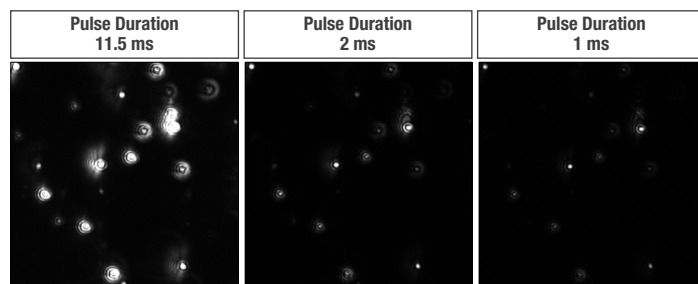
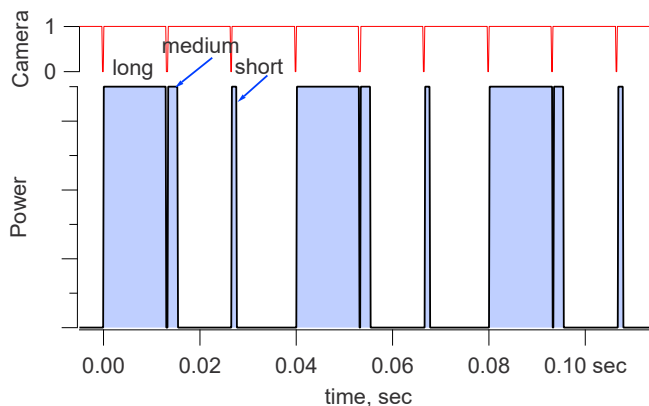
Why Traditional NTA is Insufficient

Conventional nanoparticle tracking analysis (NTA) has only been somewhat successful before the advent of simultaneous multispectral NTA. The scattering of large particles can saturate the detector, while smaller particles remain too dim to be tracked, forcing a trade-off in accuracy of measurement for any real-world samples, and limited dynamic range.

This limitation is discussed in section 5.5.4 of ISO 19430:2024 Particle size analysis — Particle tracking analysis (PTA) method where it states, “...This issue adds a sample-dependent systematic undercounting or no counting at all error of smaller size fractions in a poly-dispersed samples.” While an advantage for fluorescence measurements due to multiple excitation wavelengths, a multispectral system has additional cost and complexity. There is room for another approach.

Introducing Multi-Variable Pulse NTA

Using next generation hardware and software, a series of varying pulse widths are used in place of varying laser powers. Each pulse width has its own independent sequence of video frames. Long pulse frames have good data on small particles, while short pulse frames have good data on large particles. Position as a function of time, that is particle movement, is then analyzed by the Stokes-Einstein relationship to extract particle size for each particle in the sample.



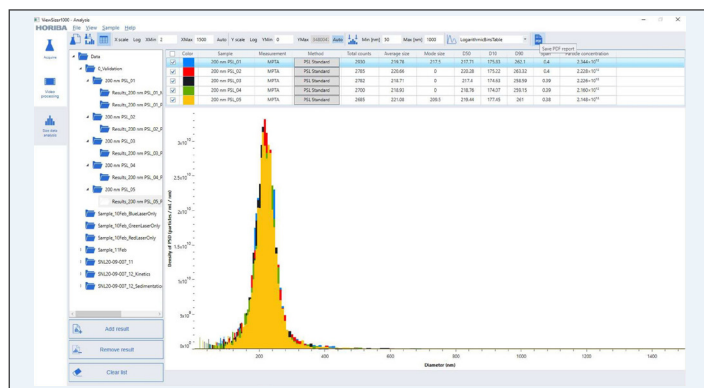
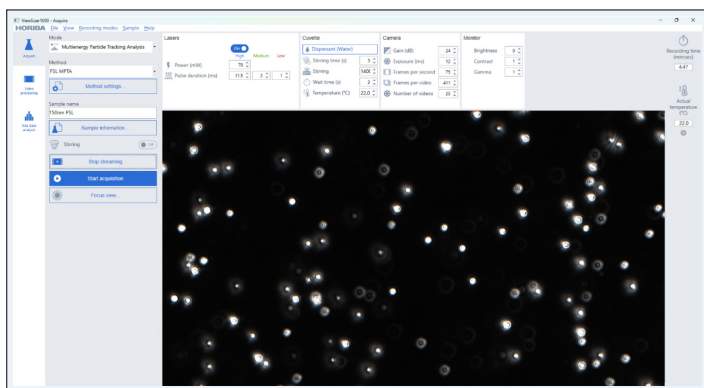
In these screen captures above, the long pulse has data on the small particles but poor images of the larger particles. Shorter pulses have good images of large particles and no data on small particles.

Since sample volume is well known, along with the number of particles images, particle number concentration is determined without any further information required. Random mixing with a stir bar (not slow flow through a tube) ensures random selection of particles for each video without the biases of a flow-based system. The instrument automatically sums the particles identified in each video and divides by the measurement volume to calculate the sample concentration.

Thus, detailed particle size distribution and concentration is rapidly measured in a single system.

Advanced Software

The ViewSizer software is designed for intuitive workflow. Data collection can be initiated with just a few clicks, with results generated in multiple exportable formats for downstream analysis. The user interface includes real-time visualization of all particles – providing valuable insights into sample behavior and data quality.



Figures 1 and 2 (above) show the ViewSizer software displaying image capture and the results screen.

Sample Handling

The sample is inserted vertically in a quartz cuvette fitted with an insert, a stir bar, and a cap. This gives the option to mix the sample in between video recording, offering a more representative analysis with repeatable and reproducible results.

The cuvette is able to handle particles dispersed in non-aqueous solvents such as xylene or other alcohols. By keeping the sample enclosed with a cap, even hazardous materials can be transferred and handled safely.



Specifications

Size Range	10 nm to 15 microns*
Sample Volume	100 microliters to 2.5 mL
Concentration	1E5 to 1E9 p/mL*
Dimensions	55 cm (W) x 66 cm (D) x 35 cm (H)
Operational Environment	15°C to 30°C with <85% RH (Dry gas purge feature allows operation below dew point)
Electrical	100 to 240 VAC, 47-63 Hz inclusive, <450 Watts
Class 1 Laser	21 CFR Ch. I part 1040

*Sample dependent

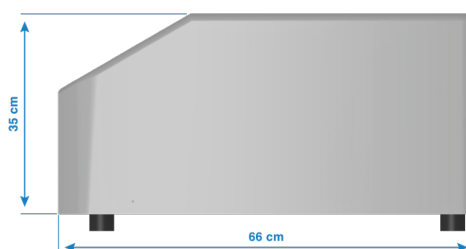
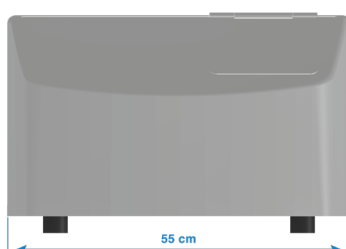
Applications

- Extracellular vesicles (EVs)/Exosomes
- Ultra-fine bubbles and nanobubbles
- Lipid Nanoparticles (LNPs)/Liposomes
- Chemical Mechanical Planarization (CMP) and other polishing slurries
- Virus and Virus-Like-Particles (VLPs)
- Metal (Nano)Particles
- Protein Aggregation
- Microplastics/Polymers
- Oceanography
- Colloids
- Emulsions

Key Features

- Collect accurate data for all particles in a sample, even for wide-size distributions, using patented multi-variable pulse technology (MVP NTA).
- Excellent repeatability and reproducibility due to stable optics, temperature control, and effective, unbiased mixing.
- Access larger particle sizes with high spatial resolution NTA for slowly moving particles, including sedimentation analysis.
- Prevent cross-contamination and increase throughput by using easily washed and replaced cuvettes.
- Flexible analysis with user access to laser intensity, camera gain, pulse duration, and frame rate settings.
- Recommended and robust default method settings for many applications are included with the system.
- Solvent resistant (wetted materials: glass/quartz, fluoropolymers, and anodized aluminum, glass/fluoropolymer cells also available)
- Reduced sample volume due to no feed tubing or pump required.

External Dimensions



**CLASS 1
LASER PRODUCT**



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