HORIBA

Explore the future

Dynamic Light Scattering Particle Size Distribution Analyzer

LB-550

An Ultra-High Sensitivity Nanoparticle Size Distribution Analyzer Capable of Measuring Samples Over a Wide Concentration Range

JQA-E-90039 (Head Office/Factory) ISO 14001 Award of Certification
Horiba received these standards for excellence from the International Organization for Standardization.
ISO 9001 JQA-0298

The debut of a new measurement tool that will prove indispensable to work in leading nanotechnology fields. Designed for a wide range of applications, from laboratory work to on-site quality control.
The HORIBA LB-550 Dynamic Light Scattering Nanoparticle Size Analyzer

Nanotechnology is a fundamental enabling technology in a variety of fields including chemistry, biology, pharmaceuticals, biotechnology, and semiconductor materials. Research and development of these next-generation technologies for the products of the 21st century call for finer particles than ever before. The LB-550 Nanoparticle Size Analyzer is an indispensable tool for monitoring these new materials.

A culmination of over 20 years of experience HORIBA has accumulated in developing particle size measurement technology, the LB-550 has a wide range of particle size and sample concentration capability, combined with high-precision and ease-of-use. The LB-550 will serve to revolutionize the heretofore difficult-to-evaluate field of nano-size control.

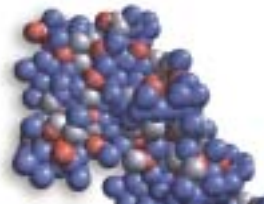
Capabilities

- Extremely wide dynamic range: 1nm〜6000nm
- Extremely wide sample concentration range measurement: (ppm~40%)
- High Resolution and precision
- Quick and Easy sample handling and measurement.
- Sample preparation system removes large contaminants.

Biotechnology

Nano-biochip technology, which uses ultra-minute processing to incorporate DNA analytical circuits in a chip the size of a fingertip, is an ultra-high-performance genome analysis technology that is capable of instantly analyzing even the genome. The design and production of such chips are influenced by the precision control technologies compatible with the DNA size order.

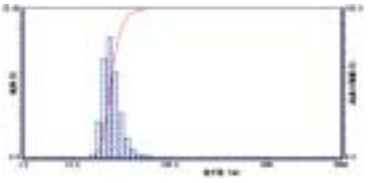
Polymer Materials



Polymer compounds are formed by nano-order molecules, can be easily modified into a variety of shapes, and can be applied to applications in semiconductor manufacturing resists, liquid crystal devices, biomedical materials, etc. The ability to measure particle size is indispensable to the research needed to discover functionality at various molecular levels.

Inorganic Materials

The LB-550 is being utilized in a diverse range of inorganic materials applications including raw materials for synthetic glass, additives for ceramic coatings and adhesives, and colloidal silica abrasives for CMP slurry. The LB-550 can monitor samples ranging from undiluted silica dispersions to diluted end-use preparations.



Every second, the real-time display window shows the measurement result instantly.

The particle size distribution is displayed **immediately after loading the sample cell.**

STEP 1 Fill the sample cell.

STEP 2 Insert the sample cell into the holder.

STEP 3 Immediately view the particle size distribution, updated every second.

Extremely wide sample concentration range capability, from very dilute samples to high concentration materials.

Horiba's unique optical design makes exceptionally wide sample concentration range measurements practical. This enables use in a wider range of applications and industries.

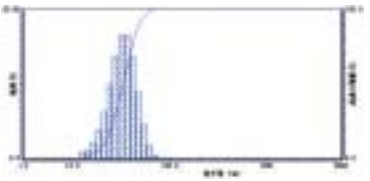
ppm orders ⟷ several 10 %

Medicine

Drug targeting research is being conducted with the goal of allowing a drug to be selectively carried to specific area so that the drug can work on the afflicted area only.
An effective targeting system for blood must be approximately 4 to 400 nm so that it does not pass through the liver or be expelled as foreign material.
The LB-550 is well suited to monitor and control the size of these materials.

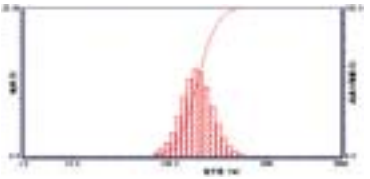
Cosmetics

Studies are being conducted on the use of nano-capsules, where the active ingredient is encapsulated in liposomes, for cosmetics and skin care designed to whiten the skin or prevent aging. The nano-capsules would penetrate below the skin's keratin layer and release the active components. Nano-technology is also being used to modify the surface of pigments in order to achieve the desired coloring.



Pigment Dispersions

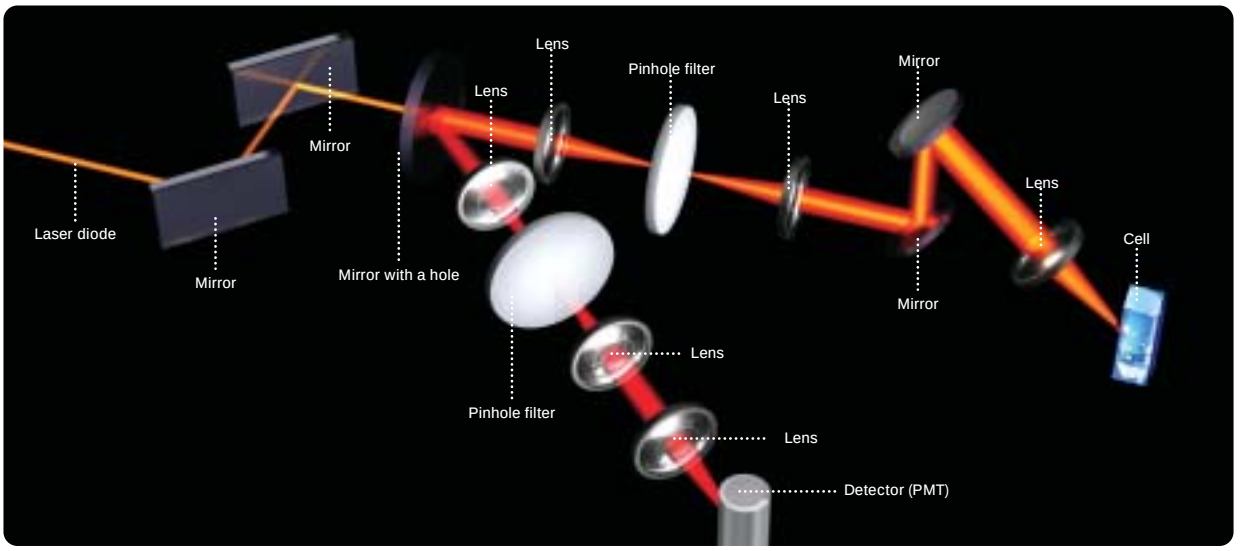
Previously, measurement of very highly concentrated samples such as pigments and printer inks required that the sample be diluted. The LB-550, however, can perform measurements over a wide range of concentration levels, making it ideal for quality control and research on material dispersion, color generation, and stability.



1nm～6000nm

HORIBA's original optical design makes it possible to perform measurements over a wide range of concentrations, from the ppm level up to 40% solids.

The focal point of the laser beam is brought as close as possible to the inner wall of the cell. This suppresses the effects of multiple scattering in highly concentrated samples and still provides sufficient signal strength for lower concentration samples because the scattered light is not attenuated by passing through a large volume of the sample dispersion. The angle of irradiation into the cell is also carefully controlled, eliminating the effects of stray and reflected light. This increases the signal-to-noise ratio and the ability of the LB-550 to measure dilute samples.



■High Sensitivity Detector

The high-sensitivity photo-multiplier tube detector can detect even minute signals from samples that absorb light, low concentration samples, or other samples that have a low scattered light signal. Horiba's advanced electronic controls provide for a wide dynamic sensitivity range, allowing the measurement of high concentration samples with the same optical system and detector.

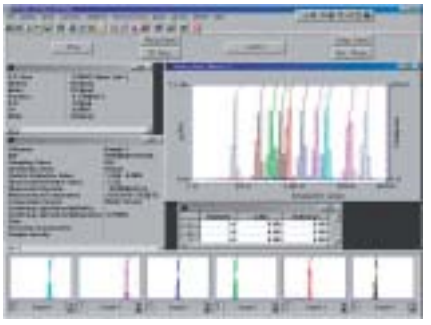
■Flexible, Powerful Algorithm

Horiba's use of a Fourier-Transform/Iterative Deconvolution calculation technique provides accurate results not only for average particle size, but also for distribution shape and identification of multiple modes, all without operator selections. By eliminating the user selections required by traditional PCS instruments, the operator is able to make accurate measurements of the full distribution with confidence.

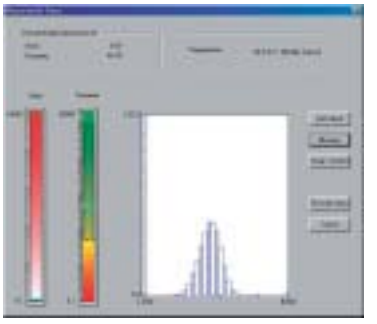
Multi-Function Software

The LB-550 software has an abundance of flexible and user-friendly functions designed to improve the efficiency of measurement operations.

Measurement Results Screen



Measurement Screen



Real-Time Window Display-Particle size distribution information is available immediately after loading the sample cell!

In addition to instantly displaying the particle size distribution in the sample cell, the real-time window also instantly displays distribution fluctuations over very brief periods of time. This makes it possible to accurately monitor dispersion stability and distribution fluctuations resulting from control temperature changes.

Automatic Cell Diagnosis Functions

Stable measurement cannot be achieved if cell cleaning is not performed completely and accurately. The LB-550 is designed to monitor cell transparency as numeric values to ensure controlled measurements made under consistent sampling conditions.

Operation Automation Wizard_ One-Button Quick Measurement

Once optimum measurement conditions have been determined, the corresponding operating procedure can be easily automated using the Operation Automation Wizard. Once an operation has been learned, the entire operational procedure can be executed automatically with just one button click.

Security Functions

The system administrator controls the access level of each operator, ensuring that standardized operations can be performed smoothly and accurately.

Increased Measurement Precision for Diluted Samples through Differential Processing

The LB-550 is equipped with a function for performing background processing using a reference sample in order to increase the measurement precision of diluted samples.

Easy, Quick, Flexible Operation

■ Easy Sampling

The use of removable cuvettes provides greater convenience and simplicity,
allowing the use of a range of commonly available cells including glass, disposable plastic, and small-volume cells.
This prevents sample contamination and makes it possible to measure ultra-minute sample volumes.
The system has also been designed to allow for the direct use of containers such as vials,
contributing to increased operability and ease-of-use.

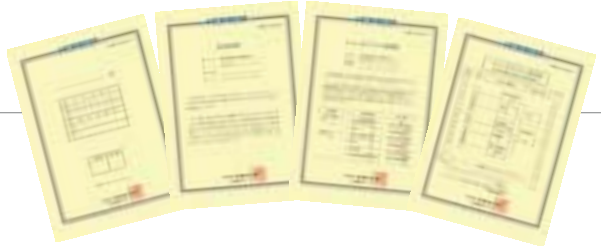
■ Precise, Automatic Control of Sample Temperature

The temperature of the sample during measurement is measured directly,
allowing for precise control of the actual sample temperature.

■ Fast Measurements

The advanced optical design and algorithm allow measurements to be taken in a fraction
of the time required by traditional DLS instruments.
This allows higher throughput, faster response to customers,
and the ability to track changes in a sample with time.

Full Validation Support



- **■ Issuing of Traceability Verifications.**
- **■ 21 CFR Part 11 Compatible Software.**
- **■ Complete IQ/OQ Validation Support**

A Diverse Range of Accessories

■ Built-in Viscometer

An internal viscosimeter can be added to
automatically measure and input viscosity
values.

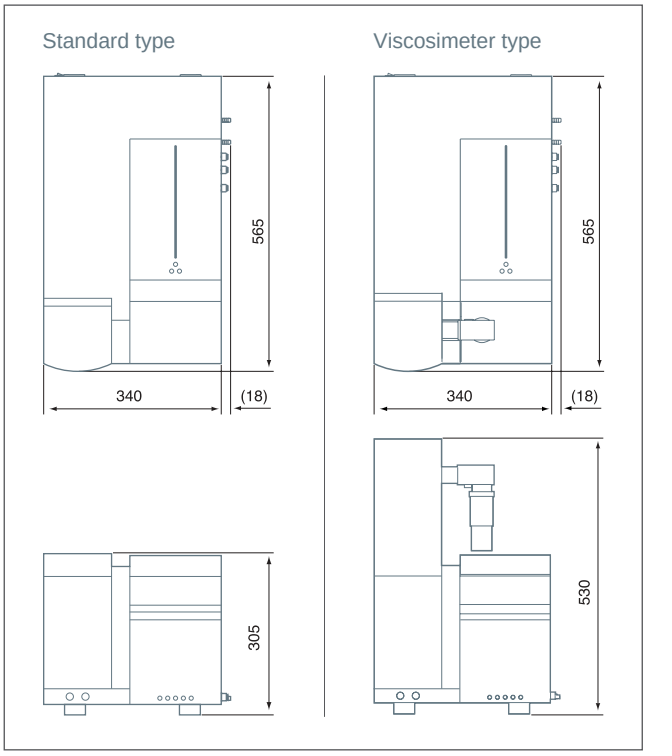
■ Sample Preparation Unit and Auto Sampler (LY-501/502)

This is a completely automatic accessory of automatic sample
preparations at high concentration.

■Specifications

Dynamic Light Scattering Particle Size Distribution Analyzer, Model: LB-550	
Measurement principle	Dynamic light scattering theory
Measurement Range	1nm～6000nm
Measurement time	Approx. 2 minutes (From start of measurement to display the result)
Required sample amount for measurement	Approx. 0.1-15 ml
Dispersion medium in use	Water, Organic solvents
Communications	SCSI II (between PC and Analyzer)
Analyzer Optical system	Light source: 650nm Laser diode, 5mW
	Detector: photo multiplier tube
	Cell: Cuvette cell
Laser type	Class 1
Temperature control range	5-70℃ Supplying cooling water is required depending on the operating environment conditions or temperature setting (The flow rate of the cooling water approximately 0.4l/min. is required.)
Operation environment	15℃-35℃ (59 ℉-95 ℉), Less than 85%RH (no condensation)
Cell holder	Attachable to a constant-temperature water bath
Power	AC100/120/230V 50/60Hz, 150VA
External dimensions	340 (W) x 565 (D) x 510 (H)mm (excluding the protruding structures)
Weight (Analyzer only)	Approx. 26kg
Data Processing, Operation unit	PC: IBM PC/AT Windows XP compatible computer
	OS: Windows XP
	Printer: Windows XP compatible printer
	Monitor: Windows XP compatible monitor
	Operation: Mouse and keyboard operation

■Dimensional outlines (mm)



Class 1 Laser

Horiba continues contributing to the preservation of the global environment through analysis and measuring technology.

Please read the operation manual before using this product to assure safe and proper handling of the product.

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Explore the future - 2003

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