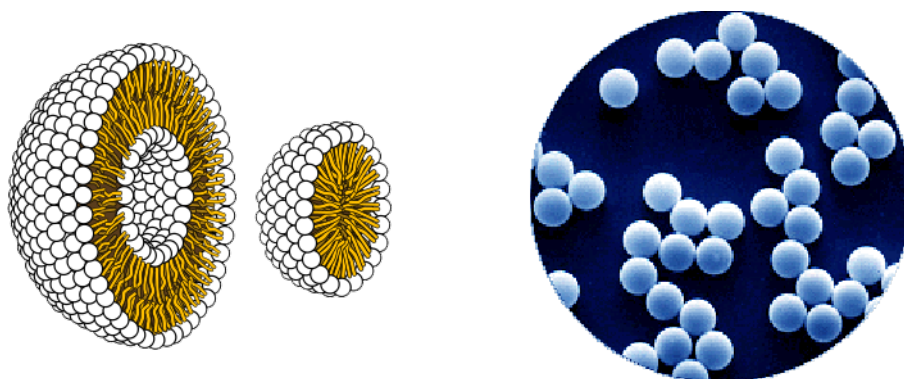




## *NanoBrook 90Plus*

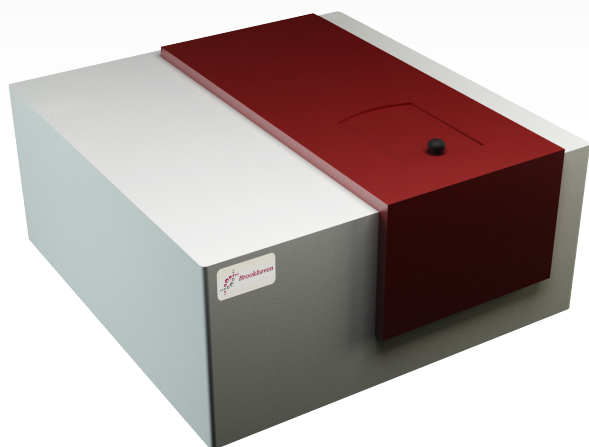
Particle Size Analyzer



Nanoparticle Sizing

## *NanoBrook 90Plus*

### Particle Size Analyzer



- Rapid and accurate particle size distributions
- Multimodal & unimodal size distribution software
- ISO 13321 & ISO 22412 compliant results
- Range: 2 nm to 6  $\mu\text{m}$
- Customizable reports
- Ideal for fast, routine sizing applications in research or quality control
- High power 35 mW diode laser
- Dynamic light scattering at 90°
- Temperature control: -5 °C to 110 °C
- Compact bench top unit, USB connection

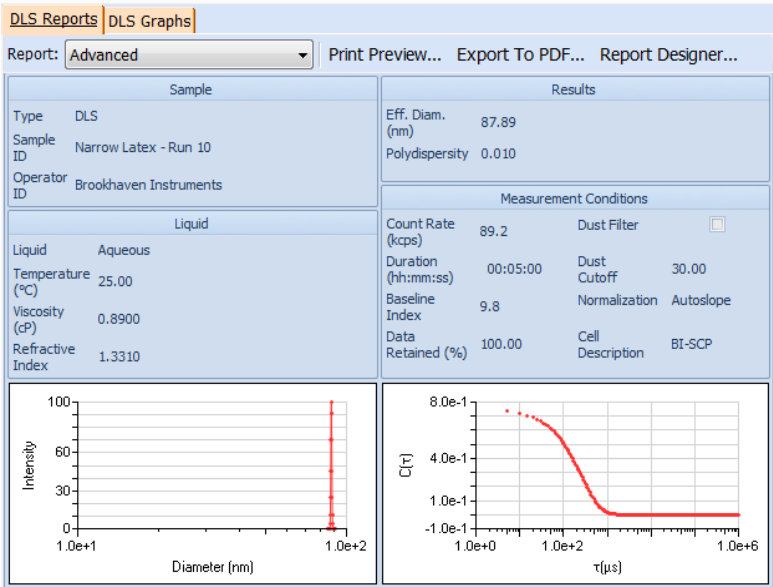
### **Rapid, Reliable, and Accurate Analysis**

The NanoBrook 90Plus particle size analyzer incorporates all you need for fast, routine, sub-micron measurements. Based on the principles of Dynamic Light Scattering (DLS), most measurements only take a minute or two. Choose the optional avalanche photo diode (BI-APD) for weak scatters. The instrument can be upgraded later on to include zeta potential measurement. Please see the 90Plus Zeta and 90Plus PALS for instruments combining sizing and zeta potential.

### **Principles of Operation**

Dilute suspensions, on the order of 0.0001 to 1.0% v/v are prepared, using suitable wetting and/or dispersing agents. A small ultrasonicator is sometimes useful in breaking up loosely-held agglomerates. Two or three mL of suspension are required to make the measurements. Disposable, acrylic square cells are used for aqueous and simple alcohol suspensions. Disposable, glass round cells with reusable Teflon stoppers are used for aggressive solvent suspensions. Just a few minutes are required for the sample and cell to equilibrate with the actively controlled temperature environment inside the NanoBrook 90Plus. A square glass cell is available if desired and special small-volume cells may be used to reduce the volume of material needed to just 50  $\mu\text{L}$  or 10  $\mu\text{L}$ . For aqueous samples the 50  $\mu\text{L}$  is a disposable cuvette. In all cases the sample is recoverable. For very small particles the high-sensitivity BI-APD detector is invaluable.

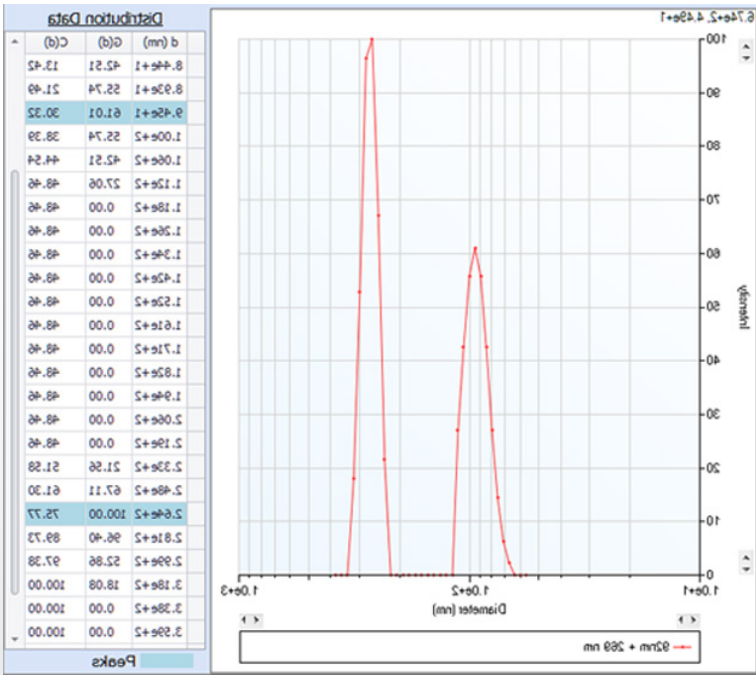
Data Presentation



The NanoBrook 90Plus particle size analyzer offers three choices. For routine determinations an average diameter (Eff. Dia.) and a measure of the distribution width (Polydispersity) are sufficient for many applications. This is illustrated on the right for latex with a narrow size distribution. The second choice is to fit these values to a lognormal distribution, allowing the user to visualize the size distribution and to interpolate cumulative and differential results at 5% intervals.

The figure above shows an example of the third choice, suitable for more complicated, multimodal size distributions. Here, a numerical algorithm, including Mie theory, is used. These results are for a mixture of known latex particles. Positions of the measured particle sizes on the accompanying graph are in excellent agreement with the known sizes of 92 and 269 nm.

During a measurement, the display can be switched interactively between any one of these -- correlation function, lognormal, or multimodal -- each shown "live" as data are accumulated. The live display is particularly useful in determining the end-point of a measurement where multimodal distribution shape may be important.



# *NanoBrook 90Plus*

## Particle Size Analyzer

### Specifications

Sample Type	Most nanoparticle, and colloidal-sized materials, in any non-absorbing liquid
Size Range	2 nm to 6 $\mu$ m diameter, depending on refractive index and concentration
Sample Cells	1 to 3mL disposable plastic, 50 $\mu$ L disposable, 40 uL quartz flow cell, 10 uL quartz minimum
Concentration Range	2ppm to 50 mg/mL, depending on refractive index and concentration
Signal Processing	Dynamic Light Scattering, DLS
Correlator	Brookhaven's TurboCorr, multitau, research grade with 510 hardware channels, covering the equivalent of 10 <sup>10</sup> linearly-spaced channels, 100% efficiency, real-time operation over the entire delay-time range.
Precision	$\pm$ 1% typically
Temperature Control	-5 ° C to 110 ° C, $\pm$ 0.1 ° C, active control. No external circulator required.
Condensation Control	Purge facility using dry air, nitrogen preferred
Standard Laser	35 mW red diode laser, nominal 640 nm wavelength
Scattering Angle	90°
Data Presentation	Average & width, lognormal fit, and multimodal size distribution standard
Compliance	ISO13321 and ISO22412 compliant results
Power Requirements	100/115/220/240 VAC, 50/60 Hz, 150 Watts
Dimensions	23.3 x 42.7 x 48.1 cm (HWD)
Weight	15 kg
Environmental Characteristics	Temperature 10 ° C to 75 ° C Humidity 0% to 95%, non-condensing
CE Certificate	Class I laser product, EN 60825-1:2001, CDRH



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