# Characterizing dilute polymer solutions using Static Light Scattering (SLS) has never been easier, more accurate, or a better value.

Rugged Design, Small Footprint

The **BI-MwA** uses a 30 mW, 635 nm diode laser and 7 angles to determine the intensity of scattered light as a function of angle and polymer concentration. From this information, one of three plots is constructed with the standard **BI-MwAZP** software: Zimm, Berry, or Debye.

From such plots, the weight-average molecular weight, M_w, the root-mean-square radius (radius of gyration), R_g, and the second viral coefficient, A_2, are calculated.

The **BI-MwA** can be used in batch or flow mode, as a chromatography detector, or for following the kinetics of polymerization using TDSLS, time-dependent static light scattering. Best of all, the **BI-MwA** has the highest performance/price ratio of any light scattering detector used for M_w determination.
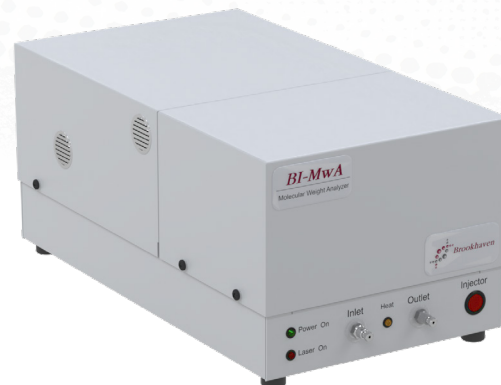
Key Capabilities

» Mw of polymers

» Natural & synthetic

» Proteins

» Study aggregation

Why Seven Angles?

A single, low angle is sufficient, theoretically, to determine M_w . However, calibration is still necessary without dust or flare light interfering. This requires an additional 90° measurement. At least two angles are required to determine R_g from a straight line fit. However, two points always determine a straight line, with no room for error. Therefore, three angles are the absolute minimum for a least squares fit. What if dust distorts one of the angular intensity values? What if more accuracy is required? For these reasons, the standard **BI-MwA** optical configuration has seven angles. Other configurations are available on request.

Rugged Design, Small Footprint

About the size of a polymer handbook, the **BI-MwA** design avoids the pitfalls of similar machines. The flow path is vertical, not horizontal, avoiding trapped bubbles. There are no sharp corners inside the cell, only conical shapes. Previous solutions are more easily flushed. The cell can withstand much higher pressures than earlier instruments of this type, up to 3.5 MPa, minimizing the chance of an expensive repair.

Unique Microcontroller & Detector Design

The unique microcontroller used in the **BI-MwA** supports four analog inputs as standard, 16 optional, all with 24-bit resolution. Two-way communication is possible using a USB port. The **BI-MwA** is completely re-programmable via flash memory. In this way, as requirements change, so does the instrument with a minimum of effort. The ultra-sensitive CCD detector is uniform in its response and, coupled with the microcontroller, allows for automatic gain adjustment over many decades of scattered intensity.

Applications

The **BI-MwA** is ideal for studying synthetic and natural polymers in solution, including proteins and polysaccharides. It enables investigations into oligomerization, complex formation, aggregation, stability, and conformation. SLS is an absolute technique for M_w determination; whereas, viscosity measurements require calibration and too many assumptions about the polymer/solvent system that may not be true in a particular case. Even shape may be determined in some cases by plotting log M_w vs log R_g. The slope of the line can indicate whether the molecule is coiled, rod-like, or spherical.

Key Features & Specifications	
Power Requirements	100/115/220/240 VAC, 50/60 Hz, 25 Watts.
Dimensions (H x W x D)	195 x 210 x 380 mm.
Weight	5.5 kg.
Options	BI-DNDC Differential Refractometer (RI detector). DI-TDLS Software for monitoring polymerization kinetics. BI-VISC Viscometer for monitoring polymer solutions in TDSLS.

Cell & Optics	
Angles	7, nominally 35, 50, 75, 90, 105, 130, and 145.
Fiber	Low numerical aperture, integral to cell.
Back Pressure	3.5 MPa (500 psi) maximum.
Fittings	Standard HPLC inlet/outlet panel.
Volume	Cell, 100 µL nominal; scattering, 20 nL nominal.
Laser	Nominal 30 mW, 635 nm, vertically polarized.
Cell	PET standard, options by request.

Electronics & Detector	
Control	Integrated, dedicated, powerful microcontroller.
Detector	CCD, ultra-high sesitivity and spatial uniformity.
Inputs	4 standard with 16- to 24-bit resolution, 15 optional with 24-bit resolution; computer selectable gain; suitable for use with most common RI, UV, and viscometer, thermocouple, thermistor, injector, pressure gauge, and pump outputs.

A policy of continual improvement may lead to specification changes.

About Brookhaven Instruments

Our talented team of scientists and engineers is dedicated to delivering the most accurate, reliable, and easy-to-use particle characterization instruments on the market. Our modular instrument design allows us to fully customize every aspect of our products, ensuring that our customers receive precisely what they need to meet their research goals. We are continuously improving our products based on feedback from customers, building on our legacy of innovation in particle science.

We strive to act as partners with our customers to ensure they get the most benefit and maximum value from their Brookhaven equipment. We offer extensive post-sale support to educate and empower customers. Whether you have questions about a specific function or are trying to set up a new experiment, our experts will be there to help you every step of the way.

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