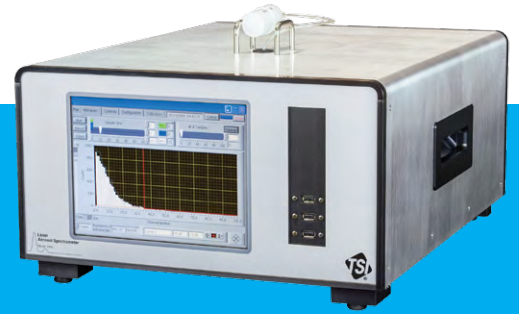


# LASER AEROSOL SPECTROMETER MODEL 3340

A HIGH RESOLUTION, 'TURN-ON-AND-GO' SIZER TO MEASURE NANOMETER AND MICRON SIZED PARTICLES!



TSI's Laser Aerosol Spectrometer (LAS) Model 3340 is a general purpose aerosol particle sizer which combines ultra-high sensitivity and superior resolution with ease-of-use. This high performance workhorse measures complete size distributions in a tenth of a second over a size range of 0.09 (90 nm) to 7.5  $\mu\text{m}$  easily and accurately. Configurable size channels enable users to zero in on a specific size range or match the resolution of another instrument.

## Valuable Addition to Your Aerosol Tool Kit

The LAS 3340 is a handy tool to have monitoring your filters or your processes, measuring in the lab, or sampling on field campaigns. It's as useful as your primary aerosol tool, but the Model 3340 can also provide valuable supplemental information to aerosol measurements based on other sizing techniques (i.e. SMPS<sup>™</sup>, APS<sup>™</sup>, CPC, FMPS<sup>™</sup> Spectrometers, etc).

## On-Board PC

The Laser Aerosol Spectrometer features an internal Windows<sup>®</sup> based PC loaded with Microsoft Office<sup>®</sup>. No need to procure and dedicate a laptop to operate your instrument. An 80-GB hard drive, keyboard, as well as a mouse, and a 10" color LCD display are included just like your personal PC. Microsoft Data can easily be transferred via Ethernet or USB port.

## Features and Benefits

### Ultra-high Sensitivity & Superior Resolution

- + Dynamic size range: 0.09 to 7.5  $\mu\text{m}$
- + Typical resolution within 2.5% of the particle diameter at 0.1  $\mu\text{m}$
- + Wide concentration range: up to 18,000 particles/ $\text{cm}^3$

### Ease of Use and Flexibility

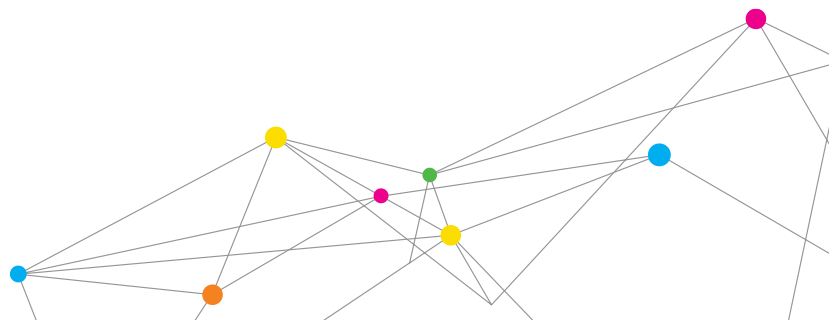
- + 100 user configurable particle size channels
- + User adjustable flow rate
- + Intuitive LabVIEW<sup>™</sup> based software
- + Remote instrument access via Ethernet

### State-of-the-Art Optical and Detection System

- + Patented wide angle optics and intracavity laser
- + Highly sensitive photodetectors
- + Automated gain ratio adjustment and laser reference compensation



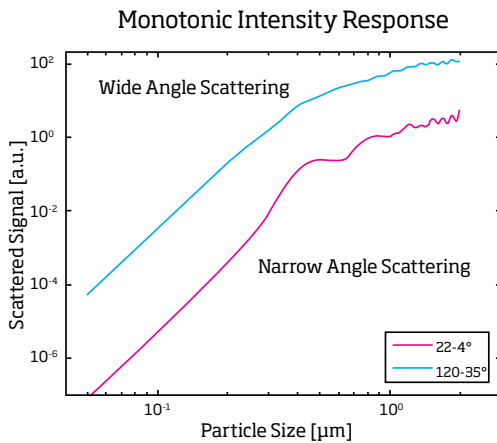
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## Operation

The Laser Aerosol Spectrometer uses the intensity of light scattered from a laser to measure the particle size. However, the 3340 is not your low precision Optical Particle Counter (OPC) which has gross resolution and bin counting. The Laser Aerosol Spectrometer is truly an optical particle sizer (OPS) featuring sophisticated optics, electronics, and flow schemes.

+ **Wide Angle Light Scattering:** The wide angle light scatter collection resolves the Mie Scatter sizing issues associated with less sophisticated optical instruments. The instrument features a monotonic response with respect to light scattered intensity which allows the instrument to achieve precise resolution.



## Calibration

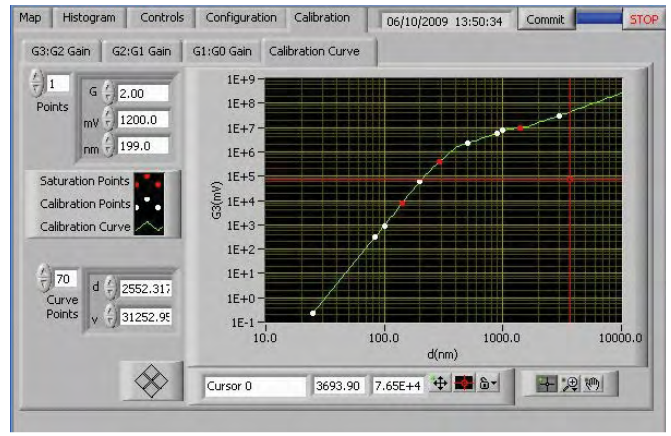
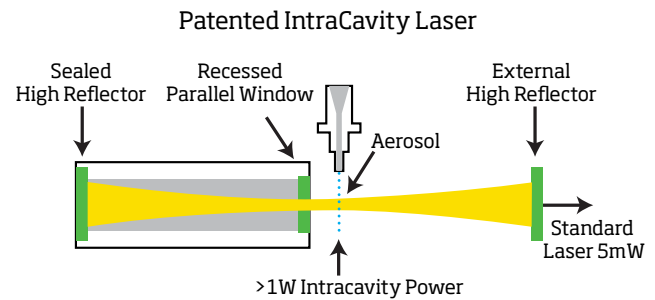
The Model 3340 is calibrated with NIST traceable Polystyrene Latex (PSL) Spheres. PSL is the industry wide calibration aerosol of choice because it has properties close to many real world aerosols and is traceable to national standards throughout the world.

+ **Custom Calibration Option:** If users would like to calibrate the Model 3340 to a specific aerosol, a custom calibration can easily be performed. The calibration screen in the software allows users to quickly generate calibration data and automatically calculate the custom calibration curve.

+ **IntraCavity Laser:** The model 3340 uses a He-Ne laser with a novel intracavity laser design to achieve higher light scattering sensitivity at a lower laser power. You get a >1W laser at a 5 mW price! This enables the Laser Aerosol Spectrometer to measure >50% of particles at 0.09 μm while at the same time boasting excellent laser lifetimes.

+ **Patented Optical Design\*:** The patented optical design also prevents laser degradation issues due to contamination by using 1) parallel transmission surfaces, 2) a recessed intracavity optical surface, 3) carefully designed components to focus the in the viewing volume and 4) a sheathe flow scheme.

\*US Patents Numbers: 5,907,575; 7,079,243; 7,295,585



## Featured Applications

The Laser Aerosol Spectrometer Model 3340 is suitable for a wide range of applications. A few are highlighted below:

+ **Filter Testing:** The high-resolution, wide-concentration range, low end size detection limit, and fast measurement time make the 3340 ideally suited for filter testing applications.

- Filter Efficiency Testing
- Disk Drive Filter testing
- Disk Drive Development and Research

+ **Indoor Air Quality:** As a stand-alone instrument, the Laser Aerosol Spectrometer provides highly resolved particle size information over a wide concentration range. Pair the LAS with a CPC and you can measure the nanometer size fraction (<100 nm) easily and in real time.

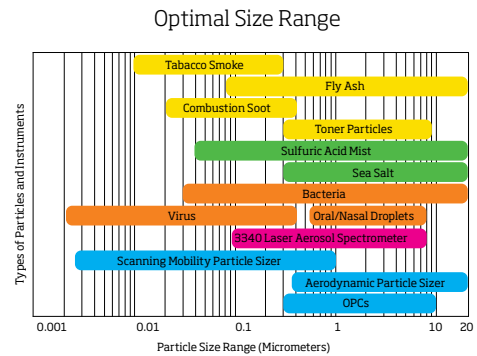
+ **Atmospheric Research & Environmental Monitoring:**

The size range, measurement time, and lack of radioactive sources or working fluids make this a very useful instrument to fly in aircraft or to transfer from environmental sampling point to environmental sampling point.

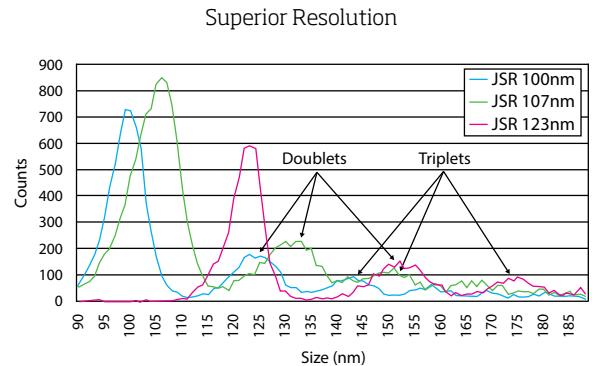
+ **Inhalation Toxicology & Exposure Monitoring:** Ease-of-use, fast measurement time, and accuracy when measuring aerosols of a known composition make this a frequent application for the Model 3340.

## Additional Applications

- + General aerosol research
- + Instrument calibration
- + Biohazard detection
- + Process monitoring
- + Pharmaceutical research
- + Powders and food products research
- + Combustion and emission studies
- + Spray analysis
- + Condensation and nucleation studies



With a size range of 0.09 (90 nm) to 7.5 µm this is the right instrument to bridge the 1 µm particle size regime, measuring both the accumulation and course particle modes.



Typical resolution is within 2.5% of the particle diameter at 0.1 µm. The Laser Aerosol Spectrometer can differentiate between 100 nm and 107 nm PSL!

# SPECIFICATIONS

## LASER AEROSOL SPECTROMETER MODEL 3340

### Particle Size Range

0.09 to 7.5  $\mu\text{m}$

### Particle Sizing Accuracy

Within  $\leq 5\%$  of particle diameter at 0.1 microns  
(typically within  $\leq 2.5\%$ )

### Zero Count

$< 1$  particle counted in 5 minutes (JIS standard)

### Counting Efficiency

$> 50\%$  at 90 nm

### Particle Concentration Range

18,000 particles/ $\text{cm}^3$  at 10  $\text{cm}^3/\text{min}$ .  
3,600 particles/ $\text{cm}^3$  at 50  $\text{cm}^3/\text{min}$ .  
1,800 particles/ $\text{cm}^3$  at 95  $\text{cm}^3/\text{min}$ .

### Number of Channels

User-selectable, up to 100

### Flow

Sample Flow Rate	User-selectable, 10-95 $\text{cm}^3/\text{min}$ . $\pm 5\%$
Sheath Flow Rate	650 $\text{cm}^3/\text{min}$ . $\pm 5\%$
Atmospheric Pressure Correction	Sample flow automatically corrected by internal flow controller.

### Environmental Operating Conditions

Operating Temperature	10 to 30°C (50 to 86°F)
Operating Humidity	10 to 90% RH non-condensing
Operating Altitude	Sea level to 4,000 meters (13,000 ft)

### Aerosol Medium

Designed for use with air. Do NOT use with pressurized, explosive, corrosive, toxic, or other hazardous gases.

### Calibration Particles

NIST traceable Polystyrene Latex (PSL) Spheres

### Laser Source

Helium-Neon (HeNe) gas laser, 633 nm,  $> 1\text{W}$  intracavity power

### Detectors

Avalanche Photo Diode (APD) and PIN photodiode

### Front Panel Display

10" Color, 640 x 480 pixels

### Operating System & Software

Windows® 7, executable VI (virtual instrument) based on LabVIEW 7.1 - generated executable, Microsoft Office®

### Communication

10/100 Ethernet (RJ45 female plug) for input/output; RS-232 for output only (9-pin D connector), USB port, for keyboard/mouse or solid-state memory devices

### Dimensions

56 x 43 x 25 cm (22 x 17 x 10 inches)

### Weight

24 kg (53 lbs.)

### Power

100-240 VAC; 50/60 Hz; 200 watts required

## TO ORDER

### Laser Aerosol Spectrometer

Specify	Description
3340	Laser Aerosol Spectrometer

Includes USB keyboard and mouse, Tygon® tubing (1/16-inch ID, 1/8-inch OD), zero count filter, operator's manual, power cord

### Accessories

Specify	Description
3079-US	Atomizer with built in pump (115V US Plug)
3079-EU	Atomizer with built in pump (230V EU Plug)
3079-UK	Atomizer with built in pump (230V UK Plug)
3433	Small Scale Powder Dispenser

Accessories must be ordered separately.

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Specifications are subject to change without notice.

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