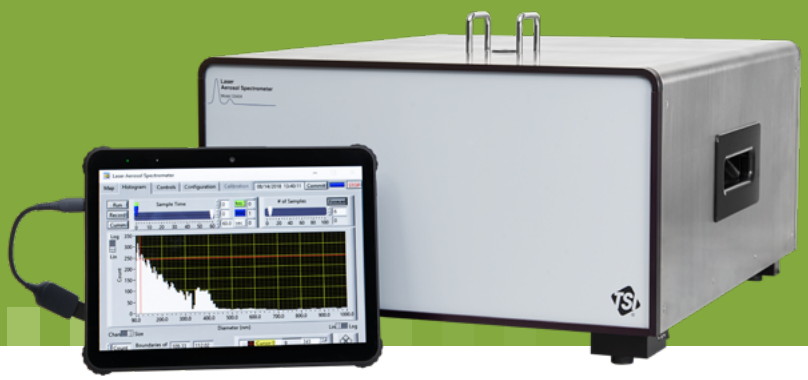
Knowledge Beyond Measure.

Laser Aerosol Spectrometer

Model 3340A



Ultra-high Sensitivity, Superior Resolution

TSI's Laser Aerosol Spectrometer 3340A 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 µm 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 Laser Aerosol Spectrometer is equally used in industry and research. It can determine the most penetrating particle size (MPPS) of high performance filters and show the particulate emission of e-cigarettes. It can also provide valuable supplemental information to aerosol measurements based on other sizing techniques (i.e. SMPS™, APS™, CPC, FMPS, etc.).

Air Cleaner Testing (CADR Testing)

The model 3340A is a standard reference instrument often used in air cleaner testing according to AHAM AC-1-2013 and local standards such as GB/T 18801-2002. Often used in combination with other TSI® components such as the Fluidized Bed Aerosol Generator 3400A and the Aerodynamic Particle Sizer 3321 it offers ultra-high sensitivity and unique advantages, e.g. fast measurements. Other applications for the Laser Aerosol Spectrometer are listed on page 3.

Features and Benefits

Ultra-high Sensitivity & Superior Resolution

- Dynamic size range: 0.09 to 7.5 µm
- Typical resolution within 2.5% of the particle diameter at 0.1 µm
- Wide concentration range: up to 18,000 particles/cm^3

Ease of Use and Flexibility

- 100 user configurable particle size channels
- User adjustable flow rate
- Intuitive LabVIEW based control software
- Microsoft Surface Pro tablet with touch screen and keyboard

State-of-the-Art Optical and Detection System

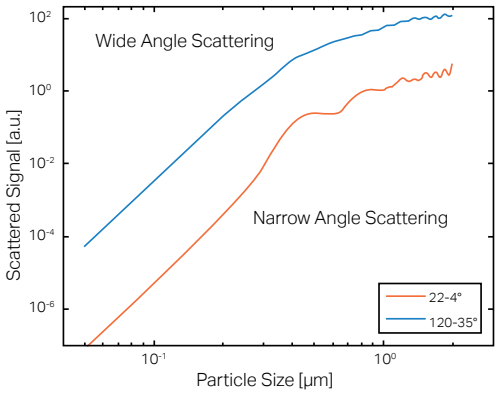
- Patented wide angle optics and intracavity laser
- Highly sensitive photodetectors
- Automated gain ratio adjustment and laser reference compensation

Operation

The Laser Aerosol Spectrometer 3340A uses the intensity of light scattered from a laser to measure the particle size. However, the 3340A 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.

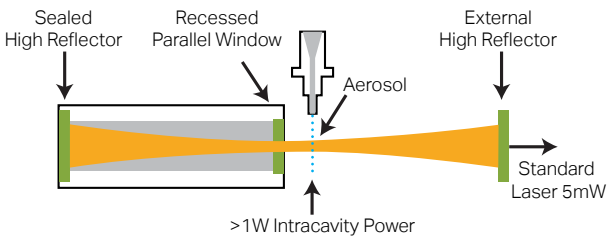
Monotonic Intensity Response



- **IntraCavity Laser:** The Laser Aerosol Spectrometer 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

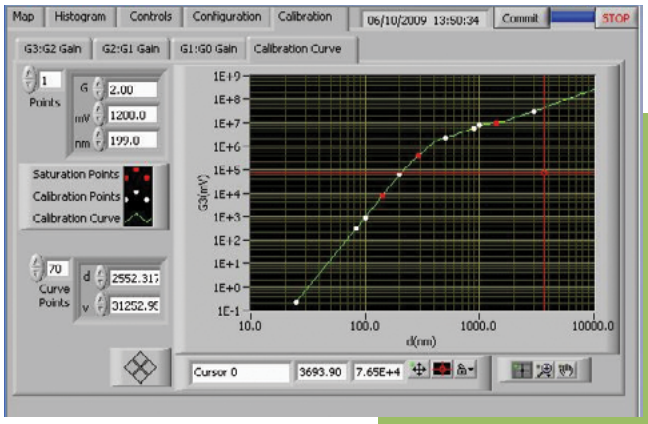
Patented IntraCavity Laser



Calibration

The Laser Aerosol Spectrometer 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 Laser Aerosol Spectrometer 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.



Featured Applications

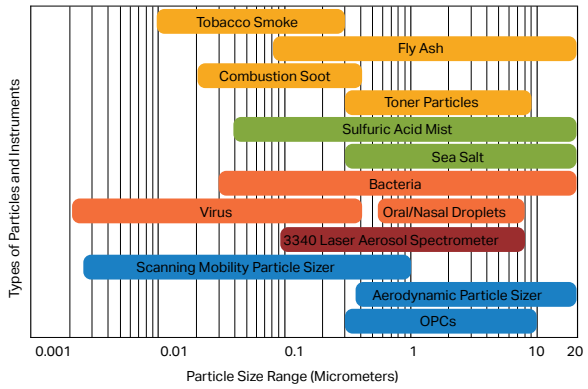
The Laser Aerosol Spectrometer 3340A is suitable for a wide range of applications. A few are highlighted below:

- **Filter Testing:** The high-resolution, wide-concentration range, low end size detection limit, and fast measurement time make the 3340A 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 model 3340A with a Condensation Particle Counter (CPC) and 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 Laser Aerosol Spectrometer.

Additional Applications

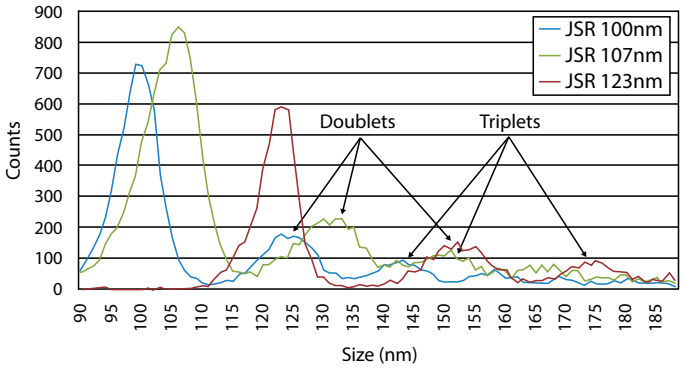
- General aerosol research
- Instrument calibration
- Biohazard detection
- Process monitoring
- Pharmaceutical research
- Powders and food products research
- Combustion and emission studies
- Spray analysis
- Condensation and nucleation studies

Optimal Size Range



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.

Superior Resolution



Typical resolution is within 2.5% of the particle diameter at 0.1 µm.
The model 3340A can differentiate between 100 nm and 107 nm PSL!

Specifications

Laser Aerosol Spectrometer

Model 3340A

Particle Size Range

0.09 to 7.5 µm

Particle Sizing Accuracy

Within ≤5% of particle diameter at 0.1 microns (typically within ≤2.5%)

Zero Count

<1 particle counted in 5 minutes (JIS standard)

Counting Efficiency

>50% at 90 nm

Particle Concentration Range

18,000 particles/cm^3 at 10 cm^3/min.

3,600 particles/cm^3 at 50 cm^3/min.

1,800 particles/cm^3 at 95 cm^3/min.

Number of Channels

User-selectable, up to 100

Flow

Sample Flow Rate	User-selectable, 10-95 cm^3/min. ± 5%
Sheath Flow Rate	650 cm^3/min. ± 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 W intracavity power

Detectors

Avalanche Photo Diode (APD) and PIN photodiode

User Interface

Control software running on a Microsoft Surface Pro tablet with 12.3 inch touch screen and keyboard

Operating System & Software

Windows 10®
Control software VI (virtual instrument) based on LabView 2017 generated executable

Communication

RS-232 (9-pin D connector) for instrument control with NI serial to USB converter to interface with control computer

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
3340A	Laser Aerosol Spectrometer

Includes Microsoft Surface Pro tablet with keyboard, 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)
3410	Dust Aerosol Generator

Accessories must be ordered separately.

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

Specifications are subject to change without notice.

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P/N 5002269 (A4) Rev C

Printed in U.S.A.

MAR-2031