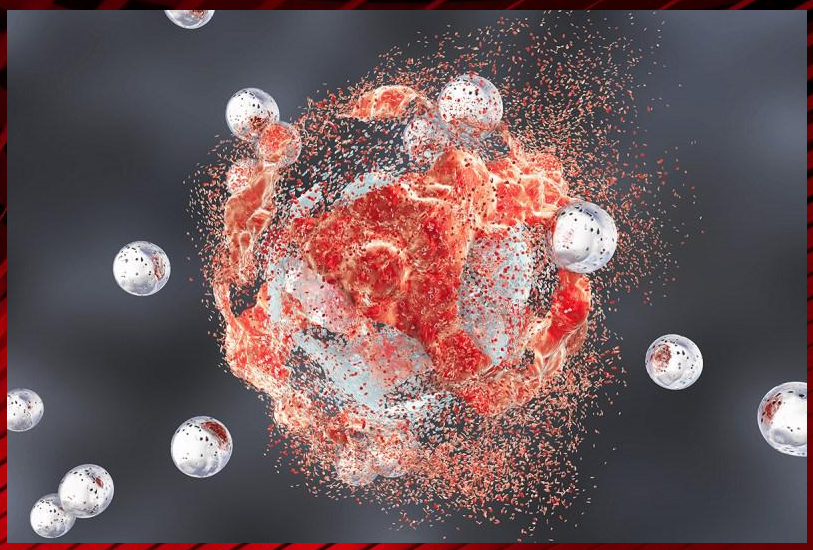


AccuSizer A7000

Single Particle Optical Sizing

Accurate determination of particle size and counts at the tail end of your distributions

Particle Sizing Systems

Building solutions one particle at a time.

Modular Design

The AccuSizer product line is based on our unique single particle optical sizing (SPOS) technology. The SPOS systems can be used as liquid particle counters for contamination applications or as sophisticated particle size analyzers of suspensions.

All AccuSizer systems consist of a sensor, pulse height analyzer (counter), and fluidics to transport the sample through the sensor. Particles flowing through the sensor scatter and obscure the incident laser beam. This light interaction creates pulses that are proportion to the size of the particle. The counter converts these pulses to particle size.

Sensors

- The LE400 sensor; collimated beam, scatter + extinction, 0.5-400 µm
- The LE1000 sensor; extinction only, 2-1000µm
- The LE2500 sensor; extinction only, 25-2500µm
- The FX; focused beam, extinction 0.7-20 µm at high concentration
- The FX Nano; focused beam, scattering 0.15 -10+ µm at high concentration

Counter

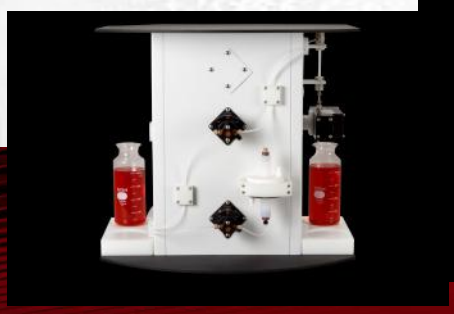
The counter provides high resolution results in up to 512 size channels.

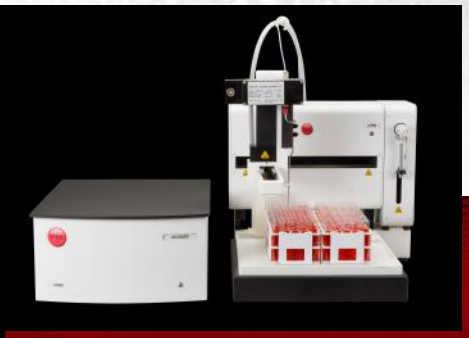
Fluidics

The sample can be transported through the sensor either without dilution or with single and two stage auto-dilution samplers.

Systems

- A2000: Contamination analysis of oils or water with or without dilution
- A7000 SIS: USP 787, 788, or 789 testing of parenteral drugs or ophthalmic solutions
- A7000AD: Single stage auto-dilution for general particle size analysis applications
- A7000APS: Two stage auto-dilution for high concentration samples and USP 729 testing
- All AccuSizer systems can be integrated with the Autosampler for complete automation.



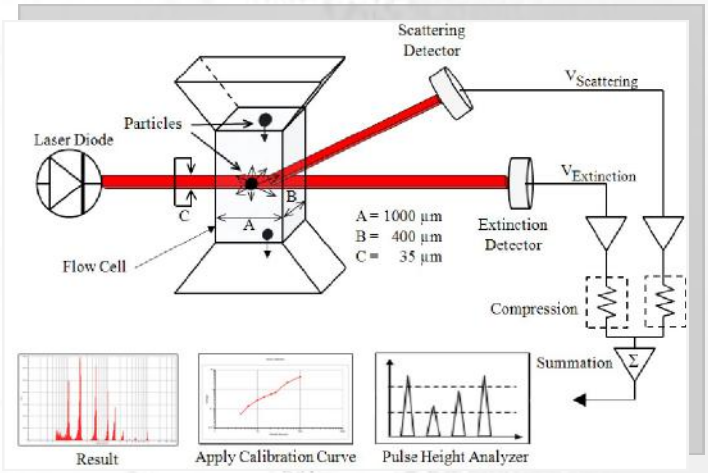


Choose the Right Sensor for Your Application

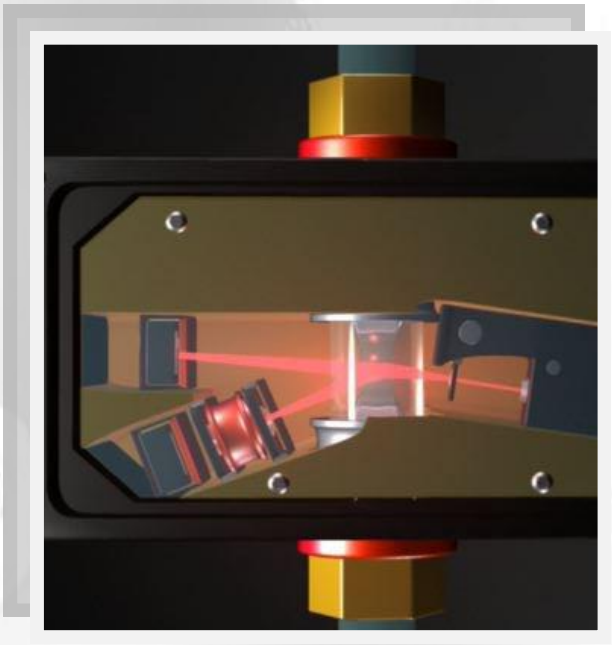
Large particle sensors use light extinction only to count and size particles from 2 -2500 µm in either liquid or air (powders). The LE-400-05 sensor includes both extinction and scattering detectors to measure particles in liquid from 0.5-400 µm. The upper concentration (coincidence) limit of the LE-400 -05 sensor is 9000 particles/mL. This sensor can be used for both contamination monitoring and for high concentration particle size analysis when coupled with one of our many auto-dilution samplers.

The AccuSizer FX sensor uses a focused laser beam and extinction detection to reduce the inspection zone, thus greatly increasing the upper concentration limit to ~10^6 particles/mL. This is the preferred sensor for higher concentration samples like CMP slurries.

The AccuSizer FX Nano sensor uses a high power focused laser beam and scattering detection to extend the dynamic range down to 0.15 µm. This sensor can be used stand alone or in conjunction with the LE-400-05 sensor to provide an exceptionally wide dynamic range for samples like aggregated proteins.



The combination of extinction and scattering is used to provide this wide dynamic range for the LE sensor.



PSS offers a range of sensors based on single particle optical sizing (SPOS) to measure particle size and concentration.

SENSOR	Description
LE1000-2	Extinction only, 2-1000 µm. suspensions or powders
LE2500-20	Extinction only, 25-2500 µm, suspensions or powders
LE400-05	Extinction + scattering, collimated laser beam (100% inspection) Range: 0.5-400 µm Concentration limit: 9000 particles/mL Sensitivity to 10 PPT Size accuracy: 2% Count accuracy: 10% Flow rate: 60 mL/min or custom calibration
AccuSizer FX	Extinction only, focused laser beam Range: 0.7-20µm Concentration limit: ~ 10^6 particles/mL
AccuSizer FX Nano	Scattering only, focused laser beam Range: 0.15-10+ µm Concentration limit: ~ 10^6 particles/mL

AccuSizer Systems/Fluidics

The sample must be transported through the sensor at the proper flow rate and concentration. A variety of AccuSizer fluidics/samplers are used for this purpose – matched to the sample and application.

Low Concentration

The A7000 SIS syringe pump sampler is used for low concentration samples that do not require any dilution. Volumes down to 150 mL are drawn through the sensor and the sample is conserved for other analyses. This is the perfect system for USP 787, 788 and 789.

The A2000 is a flexible contamination counter that can measure with no dilution using one pump or a second pump can be added to provide dilution.

Concentrated

The A7000 AD is a general particle size analyzer utilizing single stage autodilution. Sample is injected into a vessel and exponential dilution then reduces the concentration to the optimum range for analysis.

High Concentration

The A7000 APS is a two stage autodilution system that easily handles highly concentrated samples like emulsions. The APS provides exceptional count accuracy and reproducibility for samples requiring up to 2 million to 1 dilution factor.

Automation

All of these sampling fluidics can be integrated with the PSS AccuSizer for high throughput sample requirements.

Single particle optical sizing proven to identify critical differences

The AccuSizer is used in wide variety if applications, both as a particle size analyzer and liquid particle counter. Many of these applications capitalize on the unmatched sensitivity to large particle tails.

Large particle outliers (tails) can mean the difference between good and bad product. The AccuSizer detects tails in distributions better than any other technique.

Chemical mechanical polishing (CMP) fluids
Large particle counts (LPCs) cause defects on integrated surfaces. In both lab and process environments the AccuSizer is the most sensitive technique for detecting LPCs.

Parenteral drugs
The AccuSizer is the industry standard for many pharmaceutical procedures including USP 787, 788, 789 and 729.

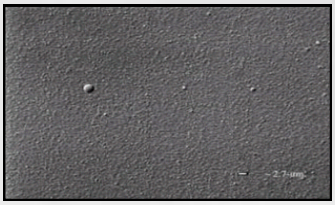
Contamination counting
The AccuSizer is a liquid particle counter used to measure the size and count of contamination particles in hydraulic fluids, oils, and water. Reports can quantify data according to industrial standards such as ISO 4406.

General particle size analysis
Many customers use the AccuSizer just as a high resolution particle size analyzer for samples ranging from inkjet inks to active pharmaceutical ingredients (APIs).

Emulsions
The tail of an emulsion droplet distribution is a valuable indication of stability. The AccuSizer is used to study emulsion stability in the pharmaceutical, beverage and chemical industries.

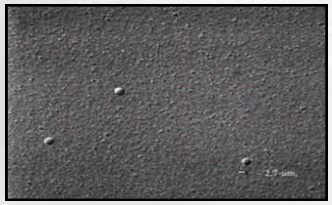
The proof is in the performance

The following photographs show two intravenous fat emulsions: one that passes USP<729> on the AccuSizer APS and one that fails. The emulsion that passes has approximately 5 large particles in the micrograph, and can safely be infused into a patient. The emulsion that fails has 9 large particles, and could be dangerous - or deadly - if infused. Unlike microscopic techniques the AccuSizer APS provides the statistical accuracy to insure ultimate confidence in the results. It is the basis of the USP<729> PFAT 5 test.

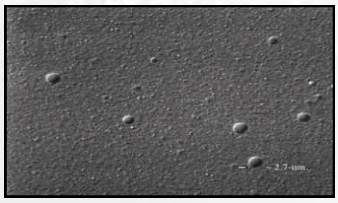


These particles make up less than 0.01 percent of the total number of particles that are 5 microns or larger in the emulsion.

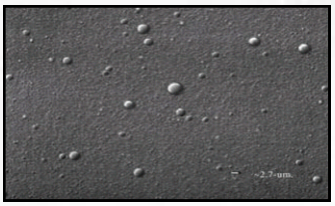
PFAT-5 < 0.01%.
This fat emulsion **PASSES.**



PFAT-5 < 0.025%.
This fat emulsion **PASSES.**



PFAT-5 < 0.10%.
This fat emulsion FAILS.



Over time, the fat emulsion becomes very unstable and the number of particles
in the tail of the distribution exceeds 20%.

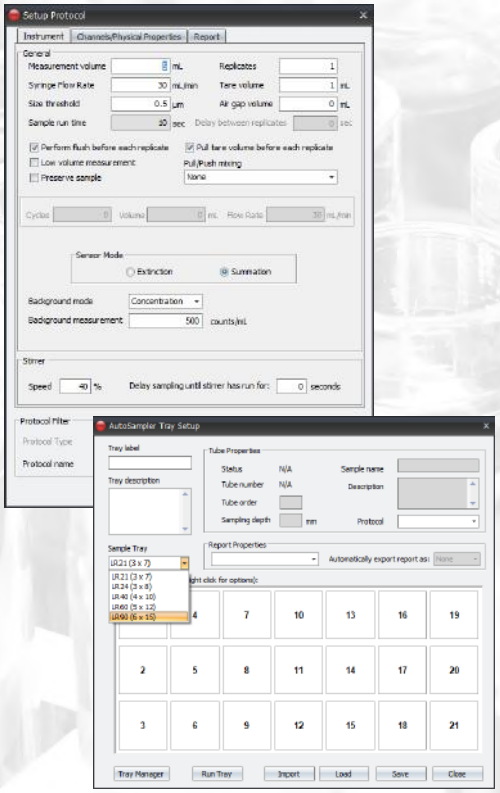
PFAT-5 < 0.20%.
This fat emulsion FAILS.

Automate your particle size analyzer

The AutoSampler is designed to meet the needs of applications where higher throughput or repetitive analyses are required.

All of these systems are controlled by PSS software packages each specifically designed to meet the rigors of the individual fluid-ics systems ad applications that they address.

Features



- Automated batch sample analysis
- Multiple sample trays available:

  3x7 samples – 30 mm tube (50 mL)
  4x10 samples – 20 mm tube (20 mL)
  5x12 samples – 16 mm tube (14 mL)
  6x15 samples – 13 mm tube (7 mL)

  Not all rack configurations are not available for all modules.

- Dual Trays of the sample configuration are also available.
- Modular easy lock and load sample trays
- Wide Dynamic Range Sensors:

  0.5 nm - 400 microns (SPOS)
  0.3 nm - 3 microns (DLS)

- Ability to pre-dilute samples such as:

  Emulsions (Food/Drug)
  Dispersions
  Proteins/Macromolecules
  Inks/Pigments/Paints
  Minerals/Alumina/Metals
  Silica packing materials (HPLC columns)
  Pharmaceutical Powders/Suspensions

- One customer analyzes approximately 400 samples/day of hydraulic oil, coolants and lube oils

- Another customer tests trays of 30 inkjet ink samples

AccuSizer Online Solutions

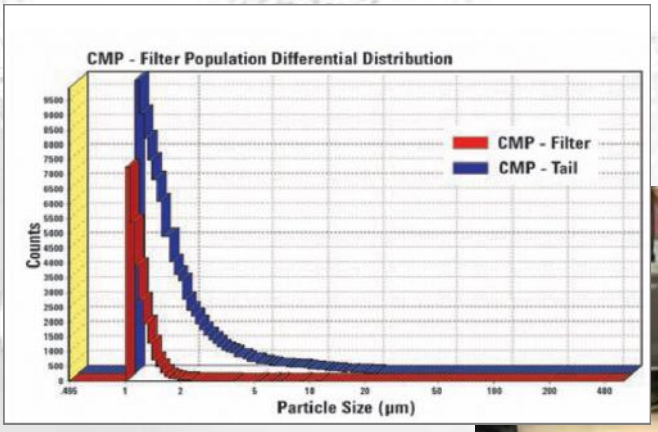
The technology that the AccuSizer line of laboratory instruments has to offer in detecting these outliers is also available in a full range of online monitoring options. AccuSizer Online systems represent a range of Autodilution fluidics which can be used to monitor processes such as homogenization, grinding and semiconductor CMP polishing.

The **AccuSizer Mini FX** slurry monitor reduces the footprint of our lab instrument and allows for point of use monitoring with continuous data acquisition at the process line. Unlike any other instrument, the FX counts and sizes millions of particles in minutes, not hours.

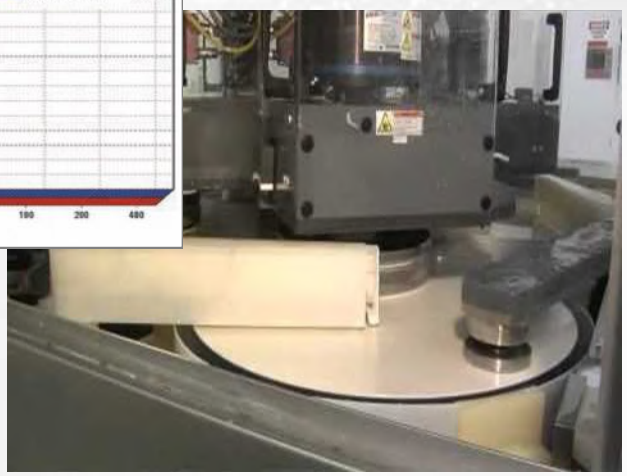
The **AccuSizer Tower FX** was designed for sequential multi-point process monitoring at-line where multiple system monitors are not viable options. Now one can have the benefits of at-line process monitoring in a self contained, fully integrated, multi-port online particle analyzer.

Sensitivity to de”tails”

CMP slurries are typically filtered during production and use. When using classical light scattering particle sizers it’s impossible to see if the filtration process is working and removing the large particle tail that has been directly related to scratches. In some cases the life time of the filter is compromised and large particles form after filtration causing defects on wafers.



The AccuSizer is sensitive enough to quantify and resolve large particles in the tail of the CMP slurry (pre-and post filtration). This takes the guesswork out of monitoring filter efficiency and removal rate - while eliminating the hassle and cost of premature filter replacement. In fact, labs have saved enough money to cover the cost of the AccuSizer itself.



We also offer DLS and ZLS Particle Analyzers

The **Nicomp N3000 DLS** Particle Size Analyzer, measures nano particle size distribution and concentrations in complex mixtures.

The **Nicomp Z7000 ZLS** Zeta Potential Analyzer, delivers reliable zeta potential measurements without sample dilution.

Unique solutions that no one else provides including:

- Autodilution
- Online
- Autosampler
- Multi-angle Goniometer

See the whole picture, use the entire product line.

Solve your sizing problems, one particle at a time. Go to

www.pssnicomp.com

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