

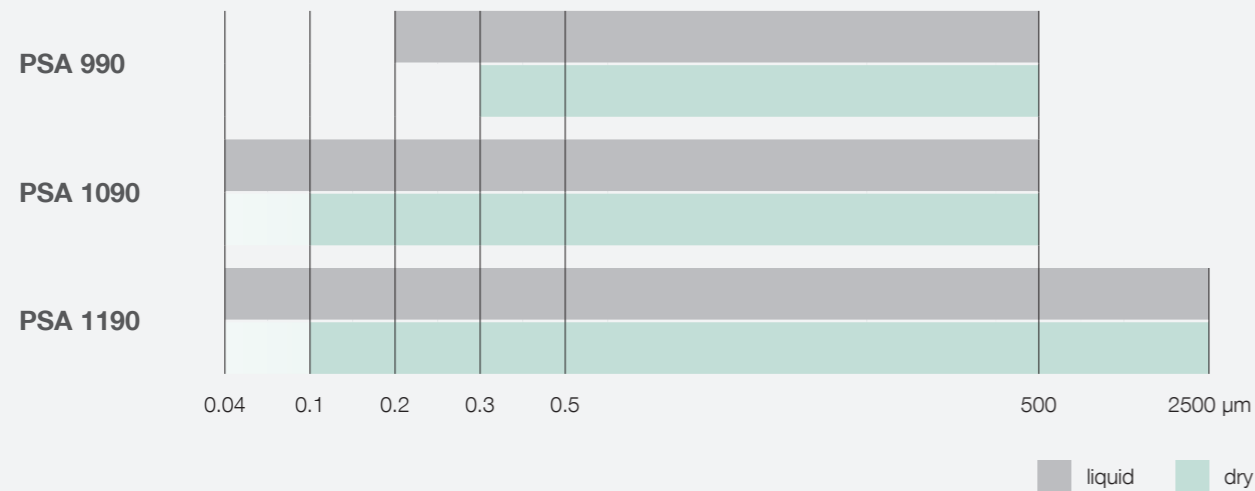
Particle Size Analyzer

Particle size analysis by laser diffraction

Anton Paar's PSA series incorporates more than fifty years of experience. The world's first laser diffraction particle size analyzer – the first-ever PSA – was invented in 1967. The three models PSA 990, PSA 1090, and PSA 1190 are designed to measure a wide range of particle sizes in liquid dispersions or dry powders.



PSA Product Family



The laser diffraction technique is an established method to measure particle sizes from the upper nanometer to the millimeter range. A laser beam is directed onto dispersed particles, then the laser light is diffracted by the particles, and the corresponding diffraction pattern is detected and evaluated. Anton Paar's PSA instruments work with high-resolution detectors to provide accurate and reproducible measuring signals that are used to calculate particle size distributions based on the Fraunhofer and Mie theories. This guarantees full compliance with the ISO 13320 and USP <429> standards.

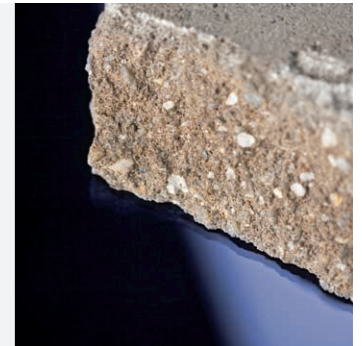
The PSA instruments stand out for their broad particle size measuring range due to

- their multiple-laser technology
- their flexibility to measure dry and liquid samples with one setup
- their high measuring accuracy and repeatability
- their robust design

Solutions for a wide range of industries

Cement & Building Materials

The PSA instruments, in fact, were designed following a request from the cement industry to develop a new technique for particle size measurement. To date, the requirements have not changed and the instruments are still widely used in the cement and building industry. The cast-iron base plate makes the system rugged enough to be used in the harshest environments. The patented (FR2933314) Dry Jet Dispersion technology ensures that the particles are homogeneously distributed within the sample. In this way, even cement samples that tend to agglomerate can be measured precisely.



Mining & Minerals

In the mining and minerals industry the robust design of the PSA instruments comes into play. All optical components are mounted on a cast-iron base plate to ensure the system remains in alignment even under the harshest conditions. The standard measurement range of 0.2 µm to 500 µm provided by **PSA 990** is ideally suited for the needs of this industry. The integrated ultrasonic transducer provides you with an effective tool to de-agglomerate samples.



Pharmaceuticals & Cosmetics

Accurate, repeatable, and traceable measurements are crucial in pharmaceutical applications. All PSA particle size analyzers are calibrated according to the ISO 13320 and USP <429> standards to ensure the highest accuracy and repeatability. The software is 21 CFR Part 11 compliant for complete traceability of results. The extended measurement range of 0.04 µm to 2500 µm provided by **PSA 1190** allows you to analyze the widest range of particles, from raw materials to final formulations.



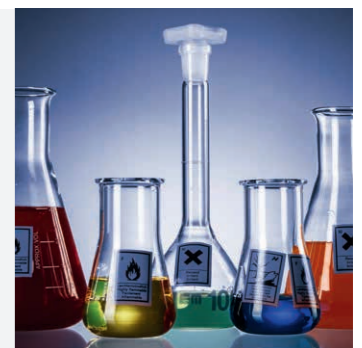
Food

Particle size is an important parameter affecting the characteristics of food products. Anton Paar's PSA instruments give important information for production, inspection of raw materials, product development, and quality control. The **PSA 1190** particle size analyzer covers a measuring range from 0.04 µm to 2500 µm and allows both small and large particles to be characterized. The "free fall" module, specifically designed for fragile food samples, ensures the non-destructive transport of the sample to the measuring cell. Thus, damage to the particles due to external forces is avoided.



Chemical & Petrochemical

Companies in the chemical and petrochemical industries are challenged with analyzing particles in the sub-micrometer range. **PSA 1090** is ideally suited for these measurements because it offers the world's first dual-laser design, which guarantees the highest level of accuracy and precision from 0.04 µm to 500 µm. Only Anton Paar's laser particle size analyzers fully integrate liquid and dry dispersion modes. This eliminates the need to manually switch, adjust, or align any hardware, and saves time. Solutions are available for all types of samples, including aggressive or expensive products and reagents.



Technical highlights

Measurement of liquid and dry samples? The PSA series integrates both in one single instrument

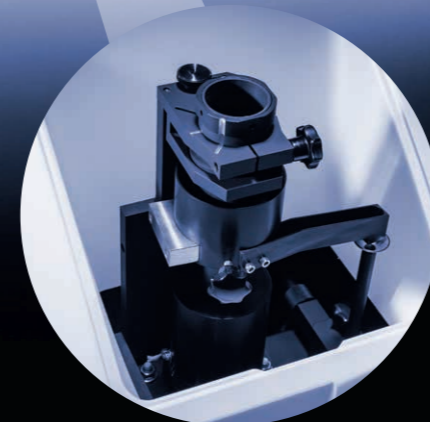
PSA instruments are the only particle size analyzers that can be configured with fully integrated liquid and dry dispersion modes in one instrument. This unique design eliminates the need for the operator to handle several accessories or make manual adjustments. The software enables the switching between liquid and dry dispersion modes with a single mouse-click, which saves time and prevents operation errors. There is no need to exchange the hardware, re-validate, or re-align sensitive optics when switching between dispersion modes.

Fully reliable results? The PSA series sets the benchmark

Anton Paar's particle size analyzers are fully ISO 13320 compliant to meet your demand for traceable, accurate, and repeatable results. Whether running samples in dry or liquid dispersion modes, the complete analyzer is qualified using certified reference materials. The unique design of the lasers and the optical bench set the market standard for a measurement reproducibility that is better than 1 % variation. Accuracy and reproducibility are guaranteed for the entire life of the particle size analyzer.

Stability for a lifetime? The unrivaled robust design of the PSA series makes it possible

The unique optical bench design has all optical components permanently mounted on a cast-iron base plate. This ensures alignment-free operation, even in the harshest environments. The rugged design ensures that the system remains aligned and this reduces the maintenance requirements to a minimum throughout the entire life of the instrument.



Accurate size distribution of powder particles? The unique Dry Jet Dispersion technology is the solution

The size of dry powders is often difficult to measure because the particles tend to agglomerate, which falsifies the results. Dry Jet Dispersion (DJD) technology is Anton Paar's patented technique (FR2933314) for efficiently dispersing and precisely analyzing powder particles. The innovative design features an air pressure regulator that quickly and easily adjusts the air flow in accordance with the sample properties. The shear forces created by the air flow separate agglomerated particles and in this way the size of each single particle can be detected.

Broad particle size range? The PSA series measures particle sizes from submicrons to a few millimeters

The single-laser PSA 990 covers a wide measuring range of 0.2 μm to 500 μm . For an even broader range, PSA 1090 and PSA 1190 have a unique optical design for diffraction analysis, which includes multiple lasers. While PSA 1090 has been designed with two lasers to resolve particles as small as 40 nanometers, PSA 1190 contains an additional third laser to cover the full measurement range of up to 2.5 millimeters.

Modules

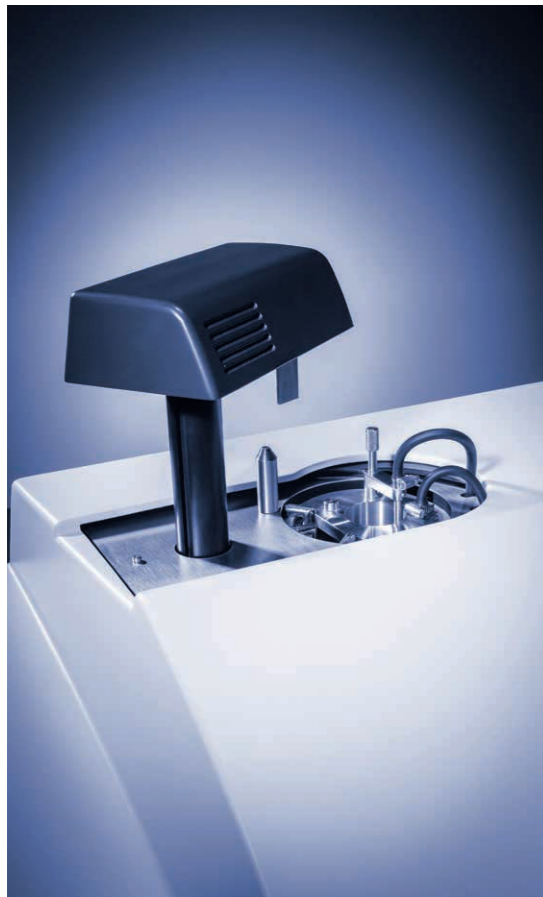


Autosampler

Anton Paar's autosampler for the PSA series is the only sampler on the market that can be used for both wet and dry dispersions, and is able to automate the sample measurement process. Available for the PSA 990, PSA 1090, and PSA 1190 models, the autosampler picks up and pours samples automatically into the particle size analyzer, enabling you to focus on other tasks. The autosampler is suitable for both industrial and lab applications.

Features

- Comes with both dry and wet modes
- Automatic pick-up and pouring of up to 30 samples
- Suitable for repeatable and high-rate cycle processes
- Time-saving
- Eliminates risk of manipulation
- Integrated rinsing cycles
- User-friendly operation integrated with the PSA software (no additional software required)



Small Volume Unit

The Small Volume Unit (SVU) was specially designed for users who need to reduce the measured sample volume e.g. of costly samples. Only 40 mL of sample is necessary to measure accurate particle size distributions. The SVU is also suitable for aggressive solvents such as acetone or benzene.

Features

- Integrated mechanical stirrer, peristaltic pump, and ultrasonic probe
- Solvent volume of down to 45 mL (PSA 1190) / 40 mL (PSA 1090, PSA 990)
- Sample quantities of down to 50 mg

Specifications

| | PSA 990 | PSA 1090 | PSA 1190 |
|-----------------------------|---|-------------------------|--------------------------|
| Measurement principle | Laser diffraction | | |
| Measuring range (dry) | 0.3 μ to 500 μ | 0.1 μ to 500 μ | 0.1 μ to 2500 μ |
| Measuring range (wet) | 0.2 μ to 500 μ | 0.04 μ to 500 μ | 0.04 μ to 2500 μ |
| Dry dispersion | Venturi | Venturi | Venturi/free fall |
| Liquid dispersion | 2 peristaltic pumps/ultrasonic transducer/stirrer | | |
| Repeatability | better than 1 % variation | | |
| Accuracy | better than 3 % variation | | |
| Measuring time | <1 min | | |
| Number of lasers | 1 | 2 | 3 |
| Laser safety classification | FDA Title 21 CFR - Part 1040 & EN 60825-1:2014 | | |
| Laser class, closed cover | Class 1 of EN 60825-1:2014 | | |
| Laser class, open cover | Class 3R of EN 60825-1:2014 | | |
| Digital data security | FDA Title 21 CFR - Part 11 | | |
| Electromagnetic compliance | EN 61326-1:2013 | | |
| Low voltage | EN 61010-1:2010 & EN 61010-2-081:2015 | | |
| Dimensions (L x D x H) | 890 mm x 530 mm x 430 mm; 35 in x 21 in x 17 in | | |
| Weight | ~ 55 kg | | |

