

Dynamic Image Analyzer

Litesizer DIA Series



Direct Particle Sizing for True Shape Recognition

Dynamic image analysis delivers highly precise particle sizing by measuring each particle individually. It provides shape information, detects outliers among millions of particles in seconds, and eliminates the need for theoretical approximations.

Access to the particle shape information database for filtering of agglomerates, fibers, and geometrical particles.

Free-fall analysis of coarse particles and bulk material, supporting efficient sieving operations.

Patented particle preview matrix representation and software-assisted window cleanliness check.

Exceptional resolution across micrometer-to-millimeter range

Litesizer DIA offers best-in-class performance when it comes to both measurement resolution and range. A pixel resolution of 0.5 μm allows the measurement of fine particles as well as objects up to 16 mm.

Outstanding accuracy via multi-lens measurement and data aggregation

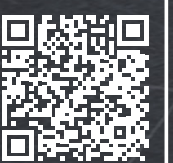
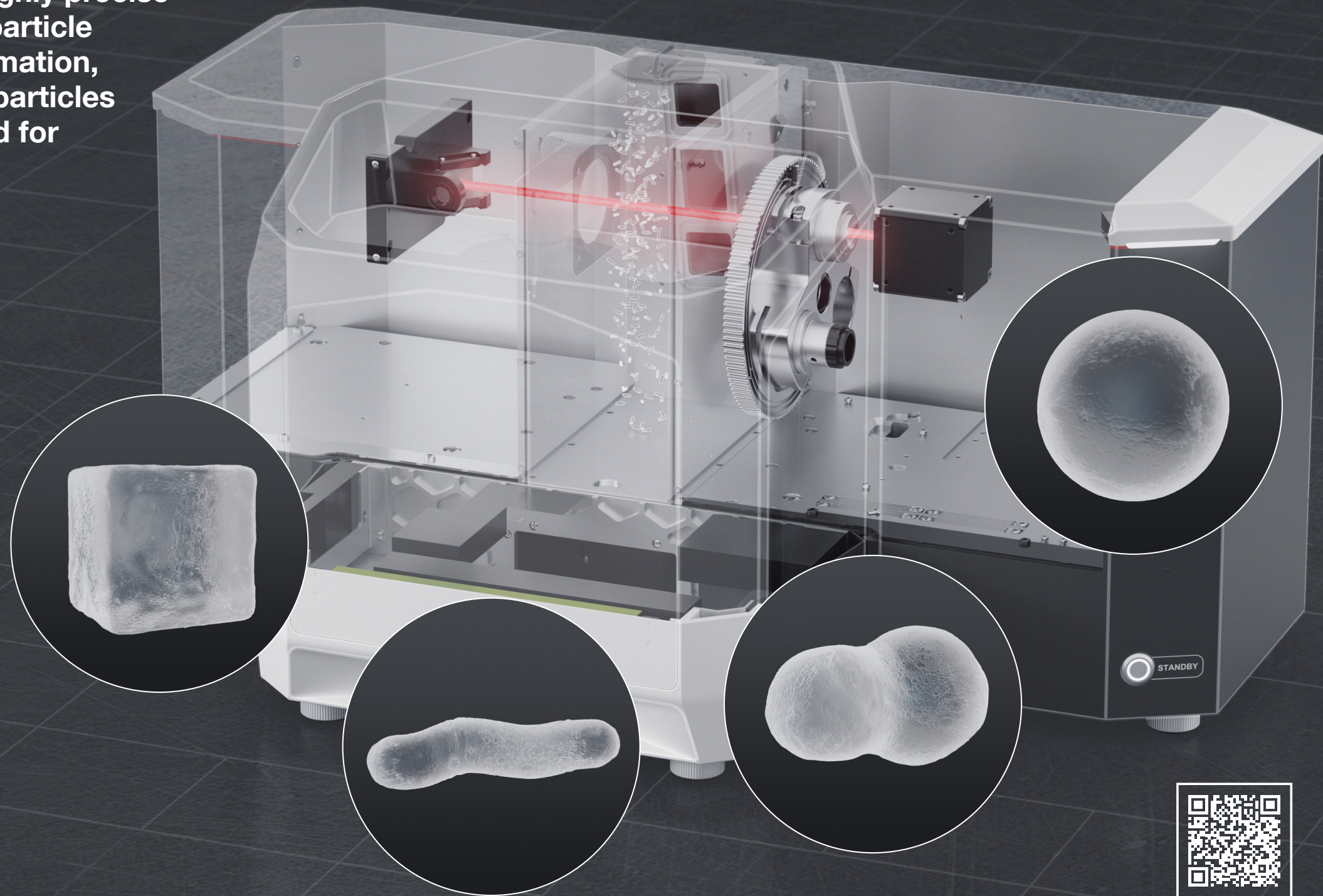
Litesizer DIA achieves the highest accuracy in particle analysis by calculating information from aggregated data collected from up to three optical magnifications.

Free-fall measurement – ideal for large particles and bulk material

The Free Fall Dispersion Unit enables the analysis of large particles and bulk materials, offering important process insights with particular value for sieving processes. Sample recovery is conveniently possible via a front drawer.

Intuitive filtering based on particle shape and size

A fully integrated database stores particle images and shape parameters for every particle of all measurements. The filtering function makes it easy to assess and evaluate properties like uniformity, texture, defects, and fiber length.

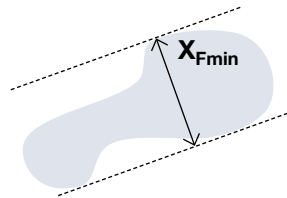


Find out more

Every Single Particle in Detail

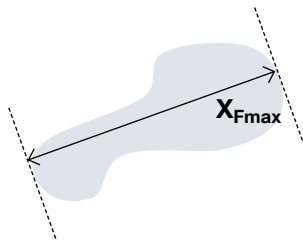
Litesizer DIA goes beyond basic size measurements. It equips you with a comprehensive suite of size and shape descriptors for each detected particle. Explore how some of these descriptors can provide insights into particle behavior, interactions, and suitability for your applications.

1



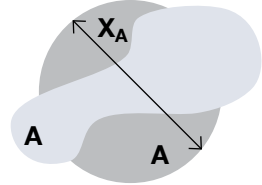
Minimum Feret diameter (xFmin)
This refers to the shortest distance between two parallel lines that completely enclose a particle. It essentially measures the width of the narrowest dimension of a particle. This descriptor is useful for understanding how easily particles can fit through tight spaces or gaps.

2



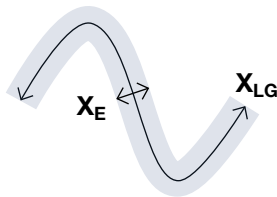
Maximum Feret diameter (xFmax)
This is the opposite of xFmin, representing the longest distance between two parallel lines that completely enclose the particle. It captures the overall size or extent of a particle. It's valuable for tasks like packing, filtration, or obstruction potential in flows.

3



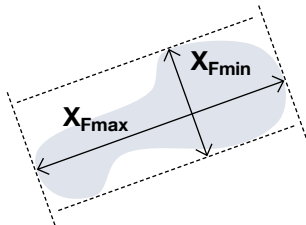
Projected area equivalent diameter (xA)
Imagine a circle with the same area as the particle's projected image. The xA is the diameter of that circle. This descriptor simplifies complex shapes into a circle, making it easier to compare particle sizes and calculate their total surface area.

4



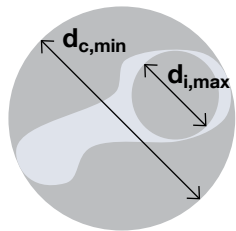
Geodesic length (xLG) and thickness (xE)
This descriptor is useful for more accurate approximations of very long and concave particles, such as fibers.

5



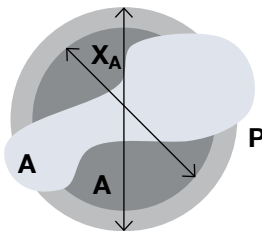
Aspect ratio
This is the ratio of a particle's width (shortest dimension) to its length (longest dimension). It helps quantify how elongated or flattened a particle is compared to a perfect circle. This descriptor is crucial in fields like material science and engineering, where the shape of particles affects properties such as flowability, packing density, and structural strength.

6



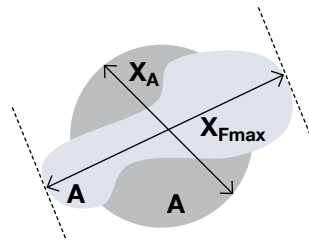
Irregularity
This descriptor compares the size of the largest circle that can perfectly fit inside the particle (di,max) to the smallest circle that can completely enclose it (dc,min). It's useful for filtering shapes that have protrusions on the surface.

7



Circularity and form factor
This descriptor measures the degree to which the particle (or its projection area) is similar to a circle, considering the smoothness of the perimeter (P).

8

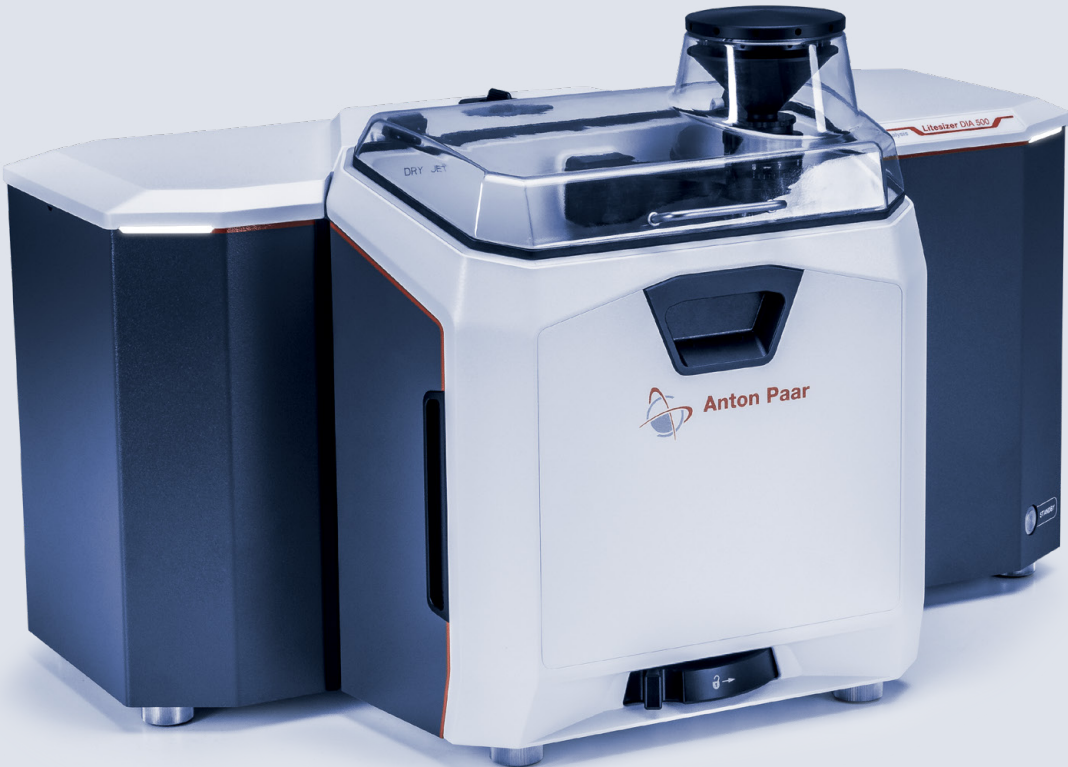


Compactness
This indicates how closely a particle approximates a compact shape, like a circle or square. High compactness values mean the particle is more solid and less spiky or hollow. This is useful for the identification of particles that have secondary shapes attached to the main shape, for example, a satellite on a round particle (additive manufacturing).

Dry Jet Dispersion Unit

The Dry Jet Dispersion Unit provides controlled air-assisted dispersion for cohesive and agglomerated powders. Adjustable dispersion energy promotes effective particle separation and helps reveal the true particle size distribution and morphology of dry materials, delivering accurate and reproducible particle characterization.

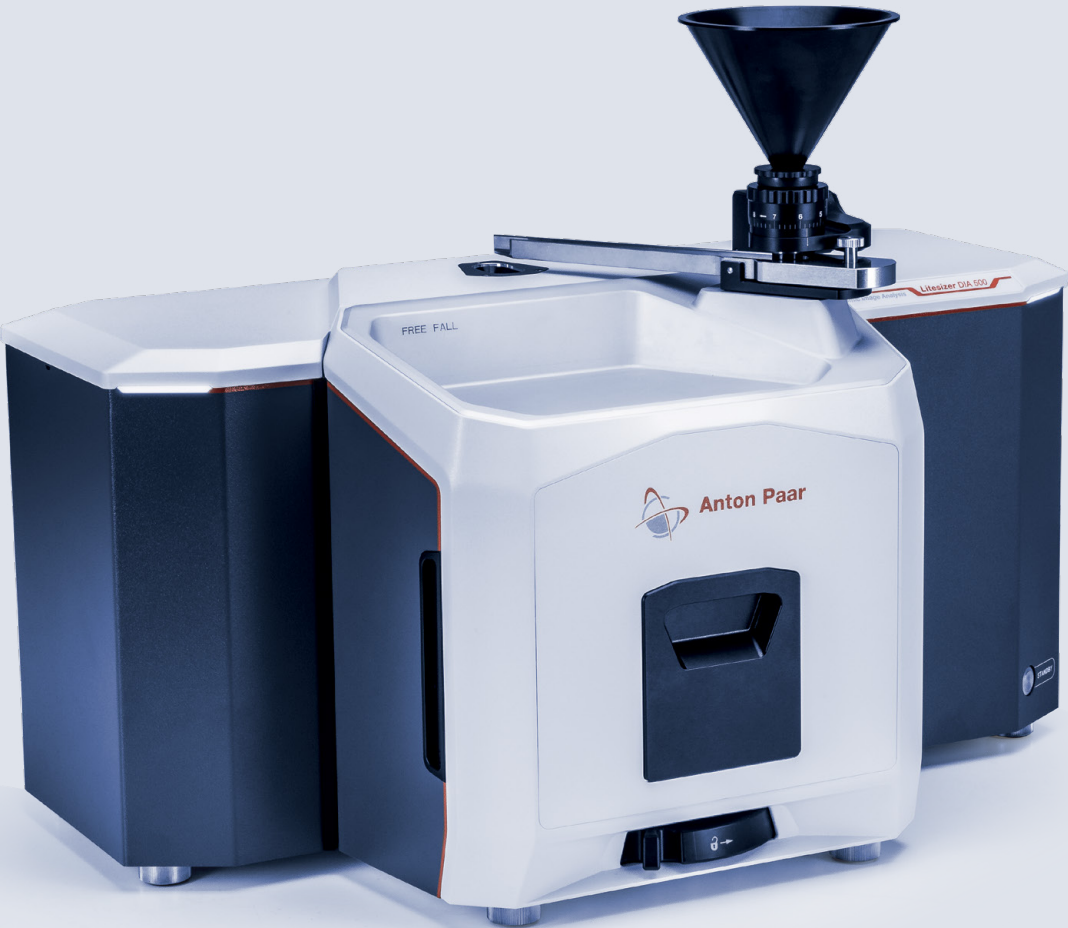
	Dry Jet Dispersion Unit
Description	Dispersion unit for deagglomerating dry materials
Dispersion method	Vibration and compressed air (pressure from 0.05 bar to 4.6 bar)
Measurement range	Up to 8,000 µm
Funnel volume	150 mL or 600 mL
Automation	Automatic feeding rate adjustment, automatic funnel emptying, automatic measurement, window cleaning
Features	Quick-Click connection (power supply, compressed gas, and sample collection provided via the main instrument)
Safety features	Built-in cover preventing spread of dust; sealed design of sample channel prevents particle escape and reduces user exposure to particles
Weight	21.3 kg (47 lbs)



Free Fall Dispersion Unit

The Free Fall Dispersion Unit provides gentle, low-energy sample dispersion for coarse and sensitive materials. By minimizing mechanical stress, it helps preserve particle shape and integrity, making it ideal for granules, crystals, fibers, sands, and weakly agglomerated particles.

	Free Fall Dispersion Unit
Dispersion method	Vibration and gravitational fall
Measurement range	0.5 µm to 16,000 µm (restrictions apply for particles >8,000 µm)
Sample holder	Funnel: 150 mL or 600 mL
Automation	Automatic feed rate adjustment, funnel emptying
Key features	Available measurement cells: 4 mm (default) or 8 mm Sample recovery using a built-in drawer
Weight	20.9 kg (46.1 lbs)

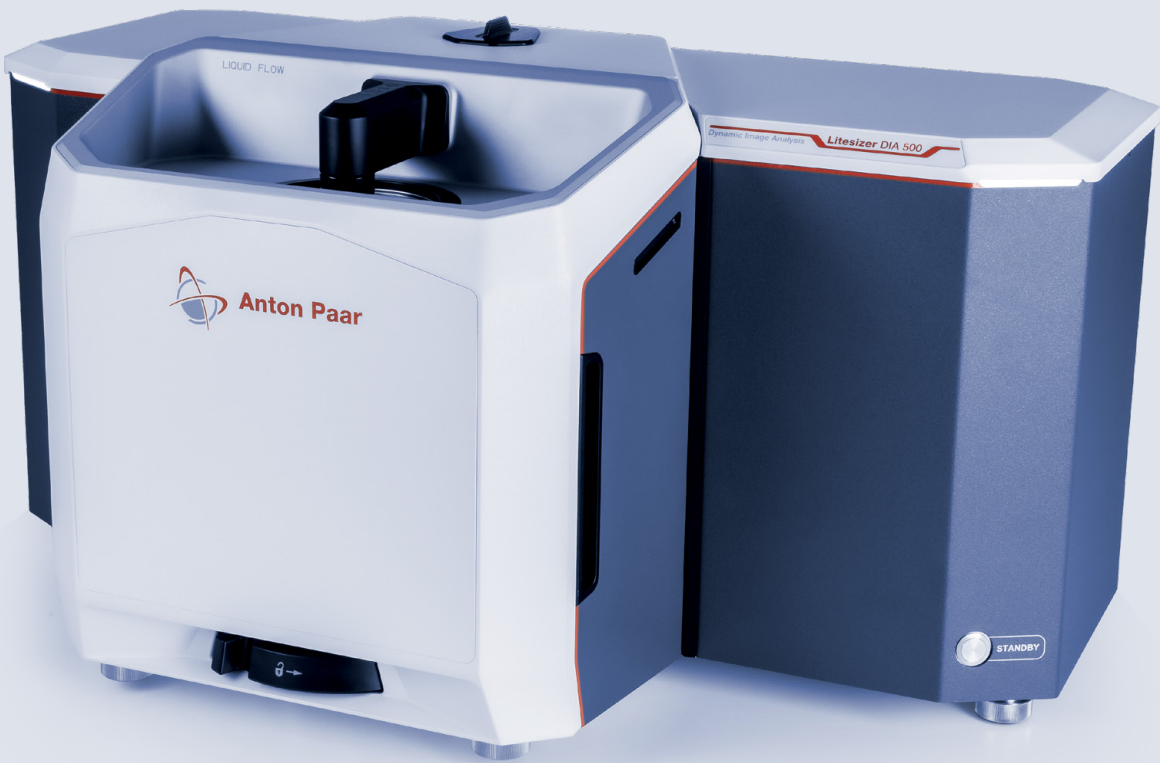


Liquid Flow and Small Flow Dispersion Units

The Liquid Flow Dispersion Unit provides controlled particle dispersion in a liquid medium for accurate characterization of suspended materials. Continuous stirring, circulation, and optional ultrasonic treatment promote effective particle separation, reduce agglomeration, and maintain a homogeneous sample, enabling accurate and reproducible determination of particle size distribution and morphology. The Small Flow Dispersion Unit supports measurements with minimal volumes of expensive, toxic, or corrosive liquids.

	Liquid Flow Dispersion Unit	Small Flow Dispersion Unit
Description	Liquid-based dispersion unit recirculating the carrier liquid within a closed circuit	
Dispersion means	Stirring and pumping (centrifugal pump, max. 2,400 RPM), sonication (max. 50 W)	Stirring and pumping (centrifugal pump, max. 2,400 RPM), sonication (max. 20 W)
Measurement range	0.5 µm to 2,500 µm	0.5 µm to 1,000 µm
Total liquid volume	150 mL to 600 mL	30 mL to 90 mL
Chemical compatibility	Liquid Flow is compatible with water, ethanol, isopropanol, and certain oils ¹ . Liquid Flow Chemical version has identical chemical compatibility as Small Flow	High-chemical compatibility; wetted parts include the following materials: FFKM, ETFE, PTFE, borosilicate glass, stainless steel 1.4404/1.4401, Hastelloy
Automation	Auto-filling of any compatible liquid ^{1,2} , auto-draining, auto-rinsing	
Features	Obscuration indicator light ³ , tank illumination, Quick-Click connection (power and liquid supply provided via the main instrument)	
Safety features	Lid cover prevents possible vapor spread; compatible with flammable liquids; liquid presence check before starting sonication	
Weight	16.5 kg (36.4 lbs)	16.3 kg (35.9 lbs)

1) For detailed chemical compatibility and wetted parts, please refer to the instruction manual
2) Litesizer Filling System might be necessary
3) Not available in options with high chemical resistance



Litesizer Autosampler

The Litesizer Autosampler automates particle size and shape analysis. It offers reliable automation for both industrial and laboratory environments.

Process up to 60 samples per cycle with automatic intake.

Add and prioritize samples even during an active run – all done in Kalliope.

Compatible with your preferred dispersion methods, including liquid, dry, and free-fall dispersion.

Automatic rinsing of all sample residuals into the liquid tank of the instrument.

Thanks to the cobot function, no additional safety measures are necessary and only minimal bench space is required.



Versatility across Industries

The Litesizer DIA series offers versatility across industries and single-particle resolution. Suitable for pharmaceuticals, chemicals, food processing, and materials science, it provides detailed, real-time insights and faster results than traditional methods.



Metal powders: Printing perfection, lasting power

In battery production and additive manufacturing, particle size and shape are crucial for performance. Litesizer DIA optimizes powder flow for efficient 3D printing, ensuring consistent layering and better packing density for durable batteries. Perfectly spherical particles enhance flow, packing density, conductivity, and product quality, resulting in longer-lasting batteries and superior 3D-printed components.



Food: Unlocking a world of flavor

A consistent coffee experience starts with consistent grinds. Litesizer DIA tracks coffee bean quality, fines, dust, and broken beans before extraction. It reveals ground shape distribution, enabling optimal extraction and richer flavor. Tailor grind size and shape for different brewing methods, ensuring a perfect cup every time. The Litesizer DIA helps unlock your coffee beans' full potential for a truly satisfying consumer experience.



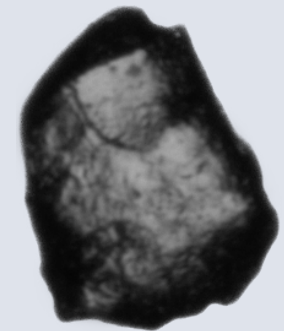
Polymers: Designing the future, one particle at a time

Particle shape significantly affects the strength, flexibility, and transparency of polymers. Litesizer DIA provides insights into particle aspect ratio and elongation, allowing you to tailor polymer properties for specific applications. Design a new, strong polymer by optimizing particle entanglement through shape control. By understanding your particles, you can create high-performance polymers for a wide range of applications, from flexible electronics to impact-resistant materials.



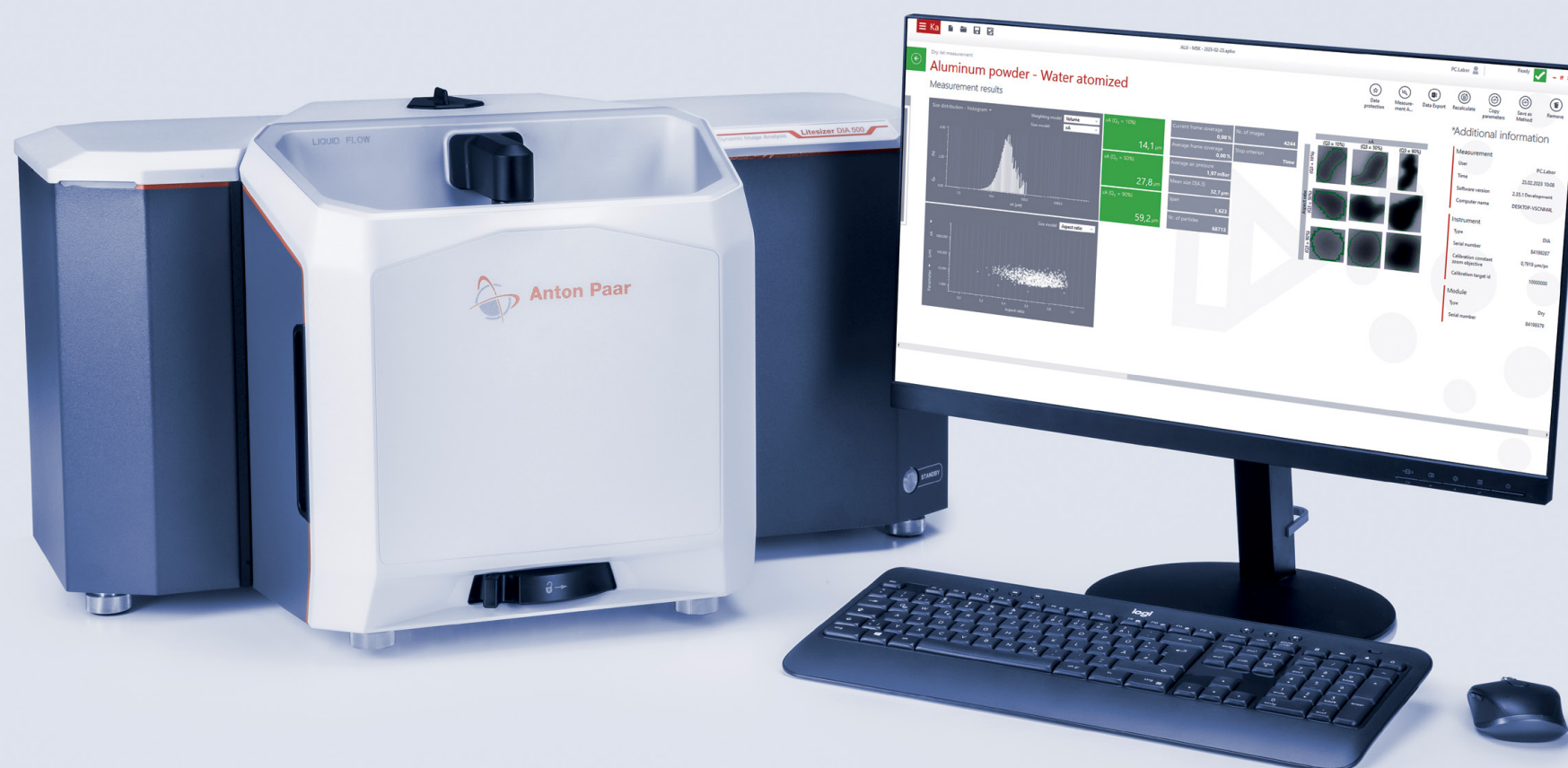
Pharma: Precision dosing, optimal results

Precise control over particle size and shape is crucial for controlled drug release and targeted delivery. Litesizer DIA's detailed analysis helps ensure consistent drug delivery profiles and improved bioavailability. Knowing whether excipients are spherical or irregular is vital for formulating supplements that dissolve at specific rates for optimal absorption. Litesizer DIA enables the creation of more effective medications with consistent dosages, improving patient outcomes and satisfaction.



Kalliope Software for Particle Analysis

The Kalliope software is a highlight of the Litesizer family, enabling particle analysis at the touch of a button.



Expert in minutes

Perform advanced measurements with minimal experience. Kalliope guides you through every step, while the Expert Advice function ensures top-class results. With Kalliope, everyone becomes an expert.

Ingenious simplicity

Kalliope's one-page workflow displays all relevant data in a straightforward overview. Input parameters, a live view of the measurement, and all results in one place consolidate measurement transparency. Additionally, measurements can be recalculated using different input parameter sets.

Live monitoring

Kalliope tracks and monitors parameters in real time. Data analysis and trend identification are easy because of very clear results presentation. The most important numeric data are tabulated under the graph to further simplify analysis.

US FDA 21 CFR Part 11

A pharma option with built-in data security functions, user management, and audit trails makes Kalliope fully compliant with the US FDA's 21 CFR Part 11. Comprehensive analytical instrument and system qualification (AISQ) is also available.

Advanced features and customization

Apply filters and analyze every image from your imaging measurements, fine-tune algorithm settings for the desired level of detail, or define optimal pass/fail criteria. Kalliope provides flexibility for both beginners and experts – during measurement, analysis, and data export.

One software – all instruments

Kalliope is compatible with all Anton Paar particle-sizing instruments. Depending on whether it's used with Litesizer DLS, DIF, or DIA, application-specific measurement modes transform the software into a focused, task-specific tool, minimizing training and maintenance time. Ongoing development ensures continuous improvements and free updates.

Particle Characterization Solutions from Anton Paar

Anton Paar offers a comprehensive range of particle characterization instruments to meet the diverse needs of R&D and QC. Each system is engineered for accuracy, ease of use, and long-term reliability.



1. Dynamic light scattering (DLS) – Litesizer DLS series

Size range: 0.3 nm to 15 μm

Designed for nanoparticle analysis, the Litesizer DLS series goes beyond size and zeta potential measurement with best-in-class performance across multiple parameters.

- Best-in-class sizing in the nanometer range, plus five additional measurement modes
- Exclusive cmPALS and Omega Cuvette technology for superior zeta potential accuracy
- Advanced fluorescence and polarization filters, functional at all detection angles
- Ultra-low sample volume capability – accurate sizing with as little as 0.8 μL

2. Dynamic image analysis – Litesizer DIA series

Size range: 0.5 μm to 16,000 μm

When shape matters as much as size, the Litesizer DIA series offers unparalleled insight into millions of individual particles.

- Widest range of size and shape analysis
- High-speed imaging and advanced data filtering
- Comprehensive suite of size and shape descriptors for each detected particle in powders, granules, and more
- Time-saving automation and safety features for handling hazardous powders or liquids

3. Laser diffraction – Litesizer DIF series

Size range: 0.01 μm to 3,500 μm

Ideal for a wide range of particle sizes, the Litesizer DIF series stands out with robust hardware and intuitive operation.

- Integrated dynamic image analysis
- Switching between dry and liquid dispersion in just one move
- Durable design for lab and production environments
- Market-leading optical setup with powerful lasers and the widest angle range



Find out more

	Litesizer DIA 700	Litesizer DIA 500	Litesizer DIA 100
Specifications			
Measurement principle		Dynamic image analysis	
Camera		5 Mpix (2448 x 2048 pixels)	
Data collection rate	220 fps/camera at 5 Mpix	144 fps/camera at 5 Mpix	20 fps/camera at 5 Mpix
Resolution	0.5 µm per pixel	0.8 µm per pixel	10 µm per pixel
Magnification	0.3x, 1x, and 6x	0.3x and 4x	0.3x
Optical features	Automatic switching between objectives Automatic merging of size ranges All magnifications are included in the standard configuration		-
Data transfer	1x 10 Gigabit Ethernet, 1x USB-A 3.0		
Automation	Automatic adjustment of the image acquisition rate		
Compliance	ISO 13322-1, ISO 13322-2, ISO 9276-1, ISO 9276-2, ISO 9276-6 ASTM E2651-19 USP <1776>, Ph. Eur. 2.9.48		
Measurement ranges			
Liquid Flow	0.5 µm to 2,500 µm	0.8 µm to 2,500 µm	10 µm to 2,500 µm
Dry Jet	0.5 µm to 8,000 µm	0.8 µm to 8,000 µm	10 µm to 8,000 µm
Free Fall	0.5 µm to 16,000 µm (restrictions apply for particles >8,000 µm)	0.8 µm to 16,000 µm (restrictions apply for particles >8,000 µm)	10 µm to 16,000 µm (restrictions apply for particles >8,000 µm)
Measurement output			
Weighting modes	Number-, surface-, and volume-weighted results		
Size and shape descriptors (ISO 9276-compliant)	Minimum and maximum Feret diameters, projected area equivalent diameter, length, geodesic length and thickness (e.g., for fibers), minimum and maximum axes of the Legendre ellipse Aspect ratio, ellipse ratio, irregularity, elongation or eccentricity, circularity, form factor, compactness, extent or bulkiness, solidity, convexity		
Image parameters	Sharpness and contrast		
Instrument data			
Dimensions (H x W x D)	400 mm x 790 mm x 290 mm (15.75 in x 31.10 in x 11.42 in)		
Weight	41 kg (90 lbs)		
Power supply	100 V to 240 V ±10 %, 50/60 Hz		
Trademarks	Kalliope (EU: 012709391), (UK: UK00912709391) Litesizer (EU: 011695491), (UK: UK00911695491)		

Reliable. Compliant. Qualified.

Our well-trained and certified technicians are ready to keep your instrument running smoothly.



Maximum uptime

Regardless of how intensively you use your instrument, we help you keep your device in perfect shape and safeguard your investment. For at least 10 years after the discontinuation of a device, we'll provide you with any service and spare part that you might need.

Warranty program

We're confident in the high quality of our instruments. That's why we provide a full three-year warranty. Just make sure to follow the relevant maintenance schedule. You can also extend your instrument's warranty beyond its expiration date.

Short response times

We know that sometimes it's urgent. That's why we provide a response to your inquiry within 24 hours. We give you straightforward help from experienced people, not from bots.

Global service network

Our large service network for customers spans 85+ locations with more than 600 certified service technicians. Wherever you're located, there's always an Anton Paar service technician nearby.



