Anton Paar

Particle Size, Shape, and Zeta Potential **Analyzers**

Litesizer Series

Particle Characterization Solutions from Anton Paar

Tailored technologies for precise results

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 1.5 µL

Page 8

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

Page 18

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.

- → 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
- → Optional particle shape analysis add-on

Page 16

FIND OUT MORE

www.anton-paar.com/apb-particle-size-analyzers

Kalliope Software
for Particle Analysis

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

FIND OUT MORE

www.anton-paar.com/apb-kalliope

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 having all results in one place consolidate measurement transparency. Additionally, measurements can be recalculated using different input parameter sets.

Real-time 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 Litesizer DIA measurements, fine-tune algorithm settings on the Litesizer DIF 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 the 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.

Litesizer: **Versatility for Industry and Academia**

1 Pharmaceuticals
Accurate particle size and shape control, performed in compliance with 21 CFR Part 11, is critical for drug formulation, targeted delivery, and dissolution behavior.

- → Litesizer DLS monitors aggregation, size, and zeta potential in real-time for protein formulations and nanoparticle drug carriers, compliant with USP <729>, supporting automated pH titration for optimal stability.
- → Litesizer DIF ensures precise, repeatable size measurements for raw materials, APIs, and final dosage forms, compliant with ISO 13320 and USP <429>.
- → Litesizer DIA adds shape characterization, such as sphericity and aspect ratio, essential for understanding excipient processing behavior and optimizing bioavailability.

2 Chemicals and advanced materials
In pigments, catalysts, and battery materials, particle properties impact flow, reactivity, and performance.

- → Litesizer DLS tracks particle size, molecular mass, and concentration for polymer dispersions and emulsions, supporting quality control and product development.
- → Litesizer DIF quickly analyzes broad size distributions, helping tune slurry behavior and pigment performance.
- → Litesizer DIA distinguishes particle morphology (e.g., fiber orientation or agglomerates), offering insight into material functionality in polymers, composites, and ceramics.

3 Cement and minerals
Efficient milling and consistent product quality in high-tonnage operations depend on particle size monitoring.

- → Litesizer DLS provides insights into nano-sized additives and colloidal phases, such as silica fume or specialty admixtures, which may enhance cement properties.
- → Litesizer DIF is a trusted tool in cement and mineral production, ideal for fast and reliable QC throughout the production process.
- → Litesizer DIA enhances control by detecting shape outliers and quantifying fines or oversized particles in processed minerals.

4 Food and beverages
Taste, mouthfeel, and solubility depend heavily on particle characteristics.

- → Litesizer DLS monitors particle size and stability in emulsions and suspensions, helping control texture, appearance, and shelf life.
- → Litesizer DIF offers fast, repeatable sizing for raw ingredients, emulsions, and final products.
- → Litesizer DIA enables quality control for grind shape (e.g., coffee), particle fragmentation, and fines detection – vital for optimizing extraction, texture, and consumer satisfaction.

5 Additive manufacturing and battery materials
Consistent powder flow and packing are crucial for 3D printing and battery electrode manufacturing.

- → Litesizer DLS detects agglomeration and monitors particle stability in suspensions and slurries, optimizing dispersion for battery electrode materials.
- → Litesizer DIF quantifies size distributions to ensure stable layering and sintering behavior.
- → Litesizer DIA goes further by evaluating sphericity, irregularities, and satellite structures to maximize flowability, packing density, and conductivity.

Litesizer DLS:
The Power to Explore

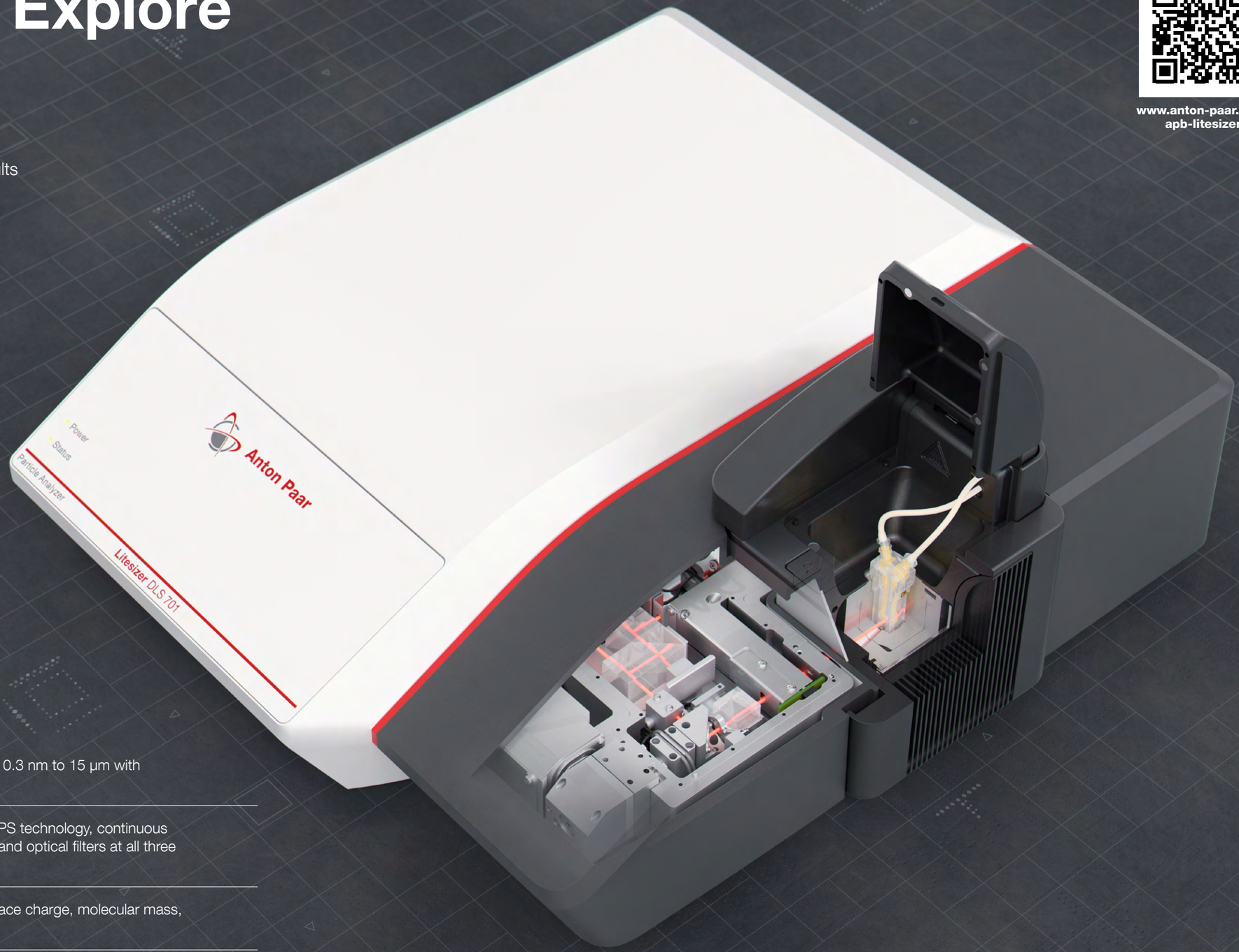
FIND OUT MORE

www.anton-paar.com/apb-litesizer

The Litesizer DLS series sets a new benchmark in nanoparticle analysis, offering precision, versatility, and ease of use. Designed to handle even the most challenging samples, it ensures fast and reliable results every time.

DLS measurements: Smarter and faster
Benefit from automatic angle selection for optimal accuracy, multi-angle particle sizing (MAPS) technology for enhanced resolution, and continuous transmittance monitoring for robust data. All three detection angles (15°, 90°, and 175°) support optical filters – including fluorescence and polarization – for flexible analysis of diverse samples.

All-in-one analysis
The Litesizer DLS is a true all-in-one solution. Beyond particle sizing, it measures zeta potential with patented cmPALS technology, molecular mass, particle concentration, refractive index, and transmittance – all from a single compact instrument.



Key benefits

- ✓ Fast, accurate particle sizing results for particles from 0.3 nm to 15 µm with sample volumes as low as 1.5 µL.
- ✓ Reliable analysis of complex samples enabled by MAPS technology, continuous transmittance monitoring, automatic angle selection, and optical filters at all three detection angles.
- ✓ All-in-one measurement solution for particle size, surface charge, molecular mass, concentration, and more.
- ✓ Intuitive three-click workflows and full regulatory compliance with Kalliope software.
- ✓ User-friendly interface and compact design for any lab environment.

The Future of **Zeta Potential Analysis**

Revolutionary cmPALS technology
cmPALS represents a breakthrough in zeta potential measurement, addressing the fundamental limitations of traditional PALS systems. This patented technology (European Patent 2 735 870) allows the modulator to make large movements, enabling shorter measurements with lower electric fields. The result: dramatically reduced electrode fouling and deterioration, delivering superior accuracy and stability for even the most challenging samples.

How a zeta potential measurement works
Zeta potential is determined by measuring the electrophoretic mobility of particles in an electric field. A laser beam passes through the sample, scattering off moving particles. The speed of this motion indicates the zeta potential's magnitude, while the direction reveals its sign. cmPALS refines this process with enhanced sensitivity and precision, providing superior accuracy and repeatability that sets new industry standards.

Omega Cuvette innovation
The specially designed Omega Cuvettes feature a unique Omega-shaped capillary that ensures almost no gradients of the applied electric field at the measuring position. This breakthrough design delivers the highest possible repeatability because fluctuations in results depending on measurement position within the capillary are negligible. The result is consistent, reproducible measurements that you can trust.

Next-level performance
With cmPALS and Omega Cuvettes, Litesizer DLS 701 and 501 set new benchmarks in zeta potential measurement. This technology combination delivers more precise and reliable results across diverse applications, achieving measurement speeds that are over six times faster than traditional PALS methods.

Key benefits of cmPALS and Omega Cuvettes

- ✓ Improved sensitivity: Detect even subtle changes in particle zeta potential.
- ✓ Enhanced stability: Achieve consistent, reproducible results every time.
- ✓ Faster measurements: Get results in minutes without sacrificing accuracy.
- ✓ Reduced sample damage: Safeguard sensitive and delicate samples during analysis with a dedicated protein measurement mode.
- ✓ Extended electrode life: Minimize fouling and deterioration for long-term reliability.

Measurement Modes

Litesizer DLS delivers comprehensive particle characterization with a suite of advanced measurement techniques – all available from a single instrument.

Particle size analysis (DLS)
Dynamic light scattering (DLS) measures particle size by analyzing how particles scatter laser light as they experience Brownian movement. Litesizer DLS provides precise size distributions from 0.3 nm to 15 µm. Multi-angle particle sizing (MAPS) technology further improves resolution for complex samples by combining data from all three detection angles.

Zeta potential analysis (ELS)
Electrophoretic light scattering (ELS) determines particle surface charge by tracking their movement under the influence of an applied electric field. Litesizer DLS uses patented cmPALS technology and the Omega Cuvette for reliable, repeatable results – essential for understanding particle stability, as well as particle-particle, and particle-surface interactions.

Molecular mass analysis (SLS)
Static light scattering (SLS) measures absolute molecular weight by analyzing scattered light intensity at fixed angles. This approach enables direct mass determination for proteins and polymers, without the need for calibration standards.

Particle concentration measurement
Litesizer DLS 701 determines particle concentration by combining particle size and scattering data. This calibration-free technique provides absolute particle numbers per volume for up to three size populations in a single measurement.

Refractive index measurement
Patented direct refractive index measurement ensures accurate size and zeta potential results by precisely determining the solvent's optical properties at the exact analysis wavelength and temperature – with ±0.5 % accuracy, as defined by ISO 22412:2017 for DLS.

Transmittance monitoring
Continuous transmittance monitoring tracks sample stability throughout your analysis. It detects sample sedimentation or aggregation in real-time, guaranteeing data reliability.

Accessories
for Litesizer DLS

Expand your analytical capabilities and boost efficiency with dedicated accessories for the Litesizer DLS series.

Optical filters
The Litesizer DLS 701 and Litesizer 501 can be equipped with fluorescence and polarization filters (horizontal or vertical) in any of the three measurement angles. This unique flexibility allows advanced measurements – including particle concentration analysis of fluorescent samples and quantum dots – with both single-angle and MAPS modes.

Flow Module FM11
FM11 enables fully automated particle size and zeta potential measurements under changing pH conditions. Easily installed on Litesizer DLS 701 and Litesizer DLS 501, it replaces the standard batch module BM11 and supports both flow-through and single-measurement cuvettes. This versatility makes it ideal for screening stability or optimizing formulations, where pH-dependency is critical.

Dosing System
The Dosing System accessory, used in combination with the Flow Module FM11, automates adjustment of the sample's pH and enables determination of the isoelectric point directly in the measurement cuvette. This enables fast, accurate tracking of zeta potential and particle size changes in response to pH shifts – eliminating manual pH titration to save time and minimize errors. All steps are programmable for full traceability and reproducibility.

Cuvettes

Litesizer DLS analyzers are compatible with a number of different cuvette types for measuring size, particle concentration, zeta potential, molecular mass and transmittance of particles dispersed in liquids, and the refractive index of the liquid itself. The table below lists all the available cuvettes and their major measurement applications.

	Disposable cuvette	Glass cuvette	Quartz cuvette	Quartz low-volume cuvette	Uvette® low-volume cuvette	C-vette	Omega cuvette	Univette
	↓	↓	↓	↓	↓	↓	↓	↓
								
APPLICATION (MEASURING PARAMETER)								
	- Particle size, MAPS - Transmittance - Particle concentration	- Particle size, MAPS - Molecular mass - Transmittance - Particle concentration	- Particle size, MAPS - Molecular mass - Transmittance - Refractive index - Particle concentration	- Particle size, MAPS - Molecular mass - Transmittance - Particle concentration	- Particle size - Transmittance	- Particle size - Transmittance	- Zeta potential - Particle size - Transmittance	- Zeta potential - Particle size - Transmittance - Particle concentration
DETAILS								
	- For aqueous solutions - Ideal sample volume: 1 mL (not less than 0.85 mL) - Disposable cell	- For aqueous and organic solvents - Ideal sample volume: 1 mL (not less than 0.85 mL)	- For aqueous and organic solvents - Ideal sample volume: 1 mL (not less than 0.85 mL)	- For aqueous and organic solvents - Minimum sample volume: 12 µL (when inserting a supporting plate into the module) - Maximum sample volume: 45 µL	- For aqueous solutions - Minimum sample volume: 50 µL - Maximum sample volume: 2 mL - Disposable cell	- For aqueous solutions - Minimum sample volume: 1.5 µL	- For aqueous solutions only - Minimum sample volume: 650 µL - For manual and automated pH titration - Disposable cell	- For aqueous solutions and organic solvents* - Minimum sample volume: 50 µL - Reusable - For highly concentrated samples
Cuvette compatibility with Litesizer DLS 701								
	✓	✓	✓	✓	✓	✓	✓	✓
Cuvette compatibility with Litesizer DLS 501								
	✓	✓	✓	✓	✓	✓	✓	✓
Cuvette compatibility with Litesizer DLS 101								
	✓	✓	✓	✓	✓	✕	✕	✓

Legend: ✓ Compatible ✕ Not compatible

*Refer to the supplier material data sheet for the list of compatible solvents.

Litesizer DIF:
From First to Best

Inspired by nearly 60 years of laser diffraction expertise, the Litesizer DIF 500 combines cutting-edge optics, a rugged design, and the power of dynamic image analysis for unrivaled data quality.

The best raw data
The best-in-class optical setup of the Litesizer DIF 500 is designed to extract the most precise data, even from the smallest sample volumes.

- → Dual solid-state lasers: A powerful 10 mW red and 25 mW blue laser delivers robust performance without warm-up. The high laser power supports measurements with minimal sample quantities and short acquisition time – perfect for sensitive or precious materials.
- → Ultra-wide detection angle: From 0.01° to 170°, Litesizer DIF 500 captures scattering data at 16 kHz, enabling superior resolution for both nano-sized and millimeter-sized particles.
- → Image analysis add-on: The Liquid Flow Imaging Dispersion Unit (see p. 22) complements laser diffraction with dynamic image analysis – ideal for quick particle shape analysis and outlier detection.

Built to last
Every element of the Litesizer DIF 500 is designed for long-term reliability:

- → Sturdy metal housing: The housing shields the high-performance interior from mechanical stress and environmental impact.
- → Vibration damping system: The system ensures stable operation even in rough environments.
- → Dust protection and IP41 rating: Internal sealings and an additional dust shield protect sensitive optics, maintaining peak performance even in challenging conditions.

Key benefits

- ✓ 10-year warranty on lasers.
- ✓ Leading laser diffraction particle sizing for any environment, whether close to production or in a high-tech lab.
- ✓ Unique dispersion unit options offer simple quick-click installation and easy access for cleaning.
- ✓ Measure the widest sample range, use hazardous carrier liquids, and even add particle shape analysis to your trusted sizing results.

Litesizer DIA:
Direct Particle Sizing for True Shape Recognition

Dynamic image analysis offers unparalleled precision in particle sizing. Unlike other techniques, it measures each particle individually, providing shape information and detecting outliers among millions in seconds. This direct measurement approach eliminates the need for theoretical approximations based on physical parameters.

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 sized objects up to 16 mm.

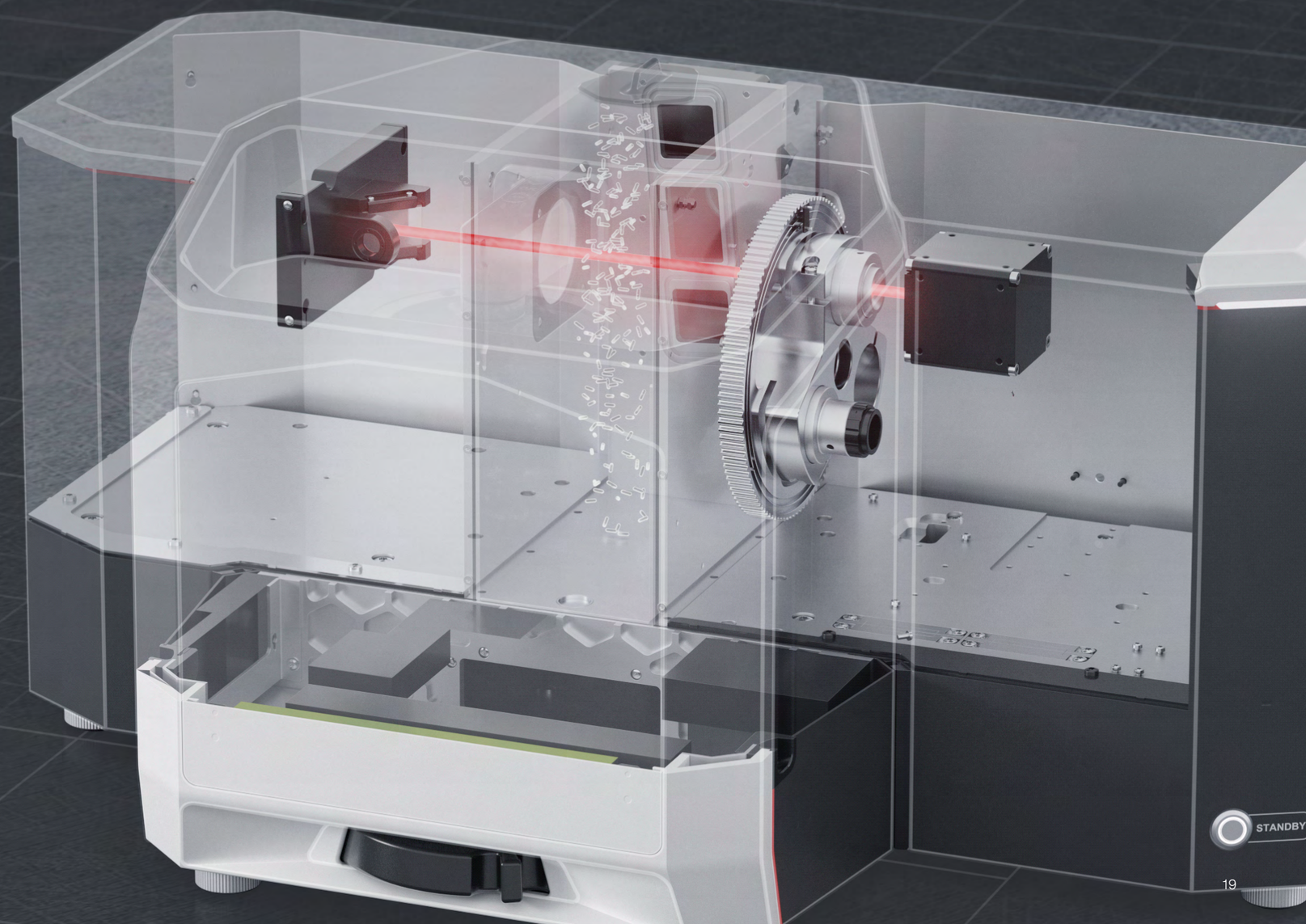
Outstanding accuracy via multi-lens measurement and data aggregation
Litesizer DIA achieves the highest accuracy in particle analysis by calculating information from aggregated data collected from up to three optical magnifications.

Free-fall measurement – best-prepared for large particles and bulk material
The Free Fall Dispersion Unit enables the analysis of large particles and bulk materials, offering important process insights, particularly useful in 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.

Key benefits

- ✓ Access to particle shape information database – filtering of agglomerates, fibers, and geometrical particles.
- ✓ Free-fall analysis of coarse particles and bulk material – supporting efficient sieving operations.
- ✓ Leverage automated features for filling, draining, and rinsing the dispersion liquid, as well as automatic feeding rate of dry samples.
- ✓ Patented particle preview matrix representation and software-assisted window cleanliness check.



Optimal Sample Dispersion

Litesizer DIF and Litesizer DIA utilize versatile dispersion units to handle a wide range of materials: Liquid Flow, Dry Jet, Free Fall, and Liquid Flow Imaging. The Quick Click feature allows switching between units in seconds, without the need to connect or reconnect cables or hoses.

1

Free Fall (DIA)
Tailored for free-flowing or fragile particles that might be damaged by more aggressive techniques, the Free Fall unit uses gravity for gentle dispersion. Effective for granular materials and food products, it also allows sample recovery from a drawer.

2

Dry Jet (DIA/DIF)
Designed for dry powders and granulates, the Dry Jet unit uses a powerful compressed air jet to disperse particles, breaking agglomerates and ensuring detection of primary particles. It is ideal for materials that clump in liquids, are moisture-sensitive, or dissolve, such as food powders, pharmaceuticals, and agricultural products.

3

Liquid Flow (DIA/DIF)
Ideal for particles in a liquid medium as well as for dry powders, the Liquid Flow unit ensures uniform dispersion by continuously circulating the sample. Its controlled flow and coupled sonication minimize aggregation and sedimentation, making it perfect for fine powders, colloids, emulsions, and suspensions. A dedicated, chemically resistant module is also available for handling organic solvents. For shape analysis, the specialized Liquid Flow Imaging Dispersion Unit is available as an add-on to laser diffraction particle sizing (see p. 22).

	Free Fall ↓	Dry Jet ↓	Liquid Flow ↓
Dispersion method	Vibration and gravitational fall	Vibration and compressed air	Stirring and ultrasonication
Measurement range	0.5 µm to 16,000 µm (restrictions apply for particles >8,000 µm)	0.5 µm to 8,000 µm	0.5 µm to 2,500 µm
Sample holder	Funnel: 150 mL and 600 mL	Funnel: 150 mL or 600 mL	Tank: 150 mL to 600 mL
Automation	Automatic feed rate adjustment, funnel emptying	Automatic feed rate adjustment, funnel emptying, window cleaning	Automatic filling, draining, and rinsing
Safety features	N/A	- Built-in cover limits dust spread - Suction check reduces the risk of powder spread - Sealed sample channel design limits particle escape and particle exposure - Also suitable for flammable powders	- Tank lid mitigates vapor spread - Liquid presence check before sonication

Key features	- Available measurement cells:
	  - Option 1: 4 mm (default)
	  - Option 2: 8 mm
	- Sample recovery using a built-in drawer
		- Available Venturi nozzles:
		  - Option 1: 0.5 µm to 3,500 µm
		  - Option 2: 0.5 µm to 5,000 µm
		  - Option 3: 0.5 µm to 8,000 µm
		- Dispersion pressure adjustment: 0.05 bar to 4.6 bar (0.7 psi to 67 psi)
			- Centrifugal pump (max. 2,400 rpm)
			- Ultrasonic unit (max. 50 W)
			- Obscuration/frame coverage indicator
			- Tank illumination

1

2

3

Liquid Flow Imaging Dispersion Unit: **Simultaneous Size and Shape Analysis**

The Liquid Flow Imaging Dispersion Unit adds shape analysis to the Litesizer DIF series laser diffraction instruments. It creates a perfect bridge between laser diffraction and dynamic image analysis technologies, and is ideal for applications requiring simultaneous size and shape information, including outlier detection.

Key benefits

- ✓ Measurement of shape parameters from 5 µm to 2,500 µm.
- ✓ Dispersion of samples using a carrier liquid.
- ✓ Inclusion of all features of the Liquid Flow dispersion unit.
- ✓ Shape and size analysis via one operating software – no need to run two different analysis tools.
- ✓ Renowned DIA software features such as particle matrix representation and particle filtering.
- ✓ No interference between the laser diffraction and dynamic image analysis measurement area.

Litesizer Autosampler: **One of a Kind**

The Litesizer Autosampler automates particle size and shape analysis. Compatible with the Litesizer DIF and DIA series, it offers reliable automation for both industrial and laboratory environments.

Key benefits

- ✓ 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 all your preferred dispersion means, such as liquid, dry, and free-fall dispersion.
- ✓ Automatic rinsing of all sample residuals into the liquid tank of the instrument.
- ✓ Thanks to the cobot principle, no additional safety measures are necessary and only little bench space is required.

	Litesizer DLS 701	Litesizer DLS 501	Litesizer DLS 101
	↓	↓	↓
PARTICLE SIZE SPECIFICATIONS			
Measurement principle	Dynamic light scattering (DLS)		
Measuring range	0.3 nm to 15 µm (particle diameter)		0.3 nm to 10 µm* (particle diameter)
Measurement angles	15°, 90°, 175°, multi-angle particle sizing (MAPS)	15°, 90°, 175°	175°
Min. concentration	0.1 mg/mL (lysozyme) lower than 0.00001 % (0.1 ppm, Latex 100 nm)		0.1 mg/mL (lysozyme)
Max. concentration	50 % w/v (sample-dependent)		
Min. sample volume	1.5 µL		12 µL
Accuracy	Better than ±2 % on NIST traceable standards		
Repeatability	Better than ±2 % on NIST traceable standards		
PARTICLE CONCENTRATION SPECIFICATIONS			
Analysis model	Mie theory	-	-
Measuring range	10^8 to 10^{13} particles/mL (sample dependent)	-	-
Size limit	1 µm	-	-
Measurement angles	15°, 90°, 175°, multi-angle particle sizing (MAPS)	-	-
Min. sample volume	12 µL	-	-
Accuracy	±10 % (sample dependent)	-	-
Repeatability	±5 % (sample dependent)	-	-
ZETA POTENTIAL SPECIFICATIONS			
Measuring principle	Electrophoretic light scattering (ELS) / cmPALS		-
Measuring range	≥±1,000 mV		-
Mobility range	10^{-11} m²/V.s to 2x10^{-7} m²/V.s		-
Size range	1.3 nm to 100 µm (diameter)		-
Min. sample concentration	0.1 mg/mL (lysozyme)		-
Max. sample concentration	70 %w/v (sample-dependent)		-
Max. sample conductivity	200 mS/cm		-
Min. sample volume	50 µL (sample-viscosity-dependent)		-
Accuracy	Better than ±10 %		-
Repeatability	±3 %		-
MOLECULAR MASS SPECIFICATIONS			
Measuring principle	Static light scattering (SLS)		-
Measuring range (mass)	300 Da to 20 MDa		-
Measuring range (particle size)	Up to 40 nm (diameter)		-
Measurement angle	90°		-
Min. sample concentration	0.1 mg/mL (lysozyme)		-
Accuracy	±10 %		-
Repeatability	±5 %		-

*Under laboratory conditions

Dispersion Unit	Liquid Flow[1]	Liquid Flow Imaging		Dry Jet
	↓	↓		↓
Description	Dispersion unit recirculating a carrier liquid within a closed circuit and dispersing the sample by stirring, pumping, and ultrasonication	Dispersion unit with closed-loop circulation of the carrier liquid, dispersing the sample via stirring, pumping, and ultrasonication; includes imaging functionality for particle shape analysis		Dry dispersion system utilizing compressed air bursts and mechanical vibration for efficient deagglomeration
Measurement range	0.01 µm to 2,500 µm			0.1 µm to 3,500 µm
Specifications for imaging analysis	-	Data collection rate	30 fps	-
		Camera	1.6 MPix resolution with 3.45 µm pixel size	
		Measurement range	5 µm to 2,500 µm	
		Data transfer	USB3.1 (USB-C interface)	
Sample holder	Tank: 150 mL to 600 mL			Funnel: 150 mL or 600 mL
Features	Centrifugal pump, max. 2,400 RPM Ultrasonic unit, max. 50 W Obscuration indicator Tank illumination Power supply provided by the main instrument Water inlet/outlet provided via the main instrument			Dispersion pressure: 0.05 bar to 4.6 bar (0.7 psi to 67 psi) Power supply provided by the main instrument Gas supply and sample collection (vacuum cleaner) provided via the main instrument
Connections of the main unit	Water supply: 0.1 bar to 3 bar at max. 40 °C (1.5 psi to 43.5 psi at max. 104 °F)			Compressed air supply: 5 bar to 10 bar (72 psi to 145 psi)
Connection to the main unit	Quick Click connection – mounting in less than five seconds			
Automation	Auto-filling, auto-draining, auto-rinsing (when using water)			Automatic feed rate control, funnel emptying, and measurement window cleaning.
Safety-related features	Tank lid preventing possible spread of vapors. Can work with flammable liquids. Checks presence of liquid before starting sonication.			Integrated protective cover minimizes dust dispersion. Suction monitoring system prevents powder release. Sealed sample channel design eliminates particle leakage and user exposure. Compatible with flammable dusts under controlled conditions.
Weight	16.5 kg (36.4 lbs)	20 kg (44.1 lbs)		21.3 kg (46.9 lbs)

[1]Liquid Flow chemical dispersion unit as option with higher chemical compatibility available.

Our well-trained and certified technicians
are ready to keep your instrument running smoothly.
Maximum uptime | Warranty program | Short response times | Global service network

	Litesizer DIF 500	Litesizer DIF 300	Litesizer DIF 100
	↓	↓	↓
Measurement principle	Laser diffraction (Mie and Fraunhofer scattering)		
Measurement range	0.01 µm to 3,500 µm	0.1 µm to 2,500 µm	0.1 µm to 1,000 µm
Size classes	144 (user adjustable)	114 (user adjustable)	104 (user adjustable)
Accuracy[a]	Better than ±0.5 % variation[b]		
Repeatability	Better than ±0.5 % variation[b]		
Reproducibility[c]	Better than ±1 % variation[b]		
Typical measurement duration	<10 sec		
Data acquisition rate	16 kHz		
LIGHT SOURCE 1			
Type	Fiber coupled laser diode		
Optical arrangement	Reverse Fourier		
Wave length	830 nm, infrared		
Power	10 mW		
Laser class	Class 1 (IEC60825-1)		
LIGHT SOURCE 2			
Type	Laser diode		
Optical arrangement	Tilted relative to IR laser		
Wave length	450 nm, blue		
Power	25 mW		
Laser class	Class 1 (IEC60825-1)		
DETECTORS			
Type	Log-spaced photo diode array and single diodes for side and back-scattering		
Angular range	0.01° to 170°	0.01° to 155°	0.01° to 155°
Focal length	300 mm		
Alignment	Automatic		

Instrument dimensions	400 mm x 790 mm x 290 mm (H x W x D)
Instrument weight	42.3 kg (93.2 lbs)
Power supply	100 V to 240 V ±10 %, 50/60 Hz
Ambient temperature	10 °C to 35 °C
Altitude	Up to 3,000 m
Ambient humidity	35 % to 80 % non-condensing
IP rating	41
Compliant with	ISO 13320:2020, USP 429, ASTM B822 – 20, ASTM D4464 - 15(2020) ASTM E2316 - 14(2019)

[a] Defined for a monomodal latex standard and accounting for manufacturer's uncertainty of standard size.
[b] Sample and preparation dependent. Defined for liquid dispersion measurements.
[c] Defined for D50 of a polydisperse standard.

	Litesizer DIA 700	Litesizer DIA 500	Litesizer DIA 100
	↓	↓	↓
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		
Weight	41 kg (90 lbs)		
Power supply	100 V to 240 V ±10 %, 50/60 Hz		

XPCIP005EN-A

www.anton-paar.com