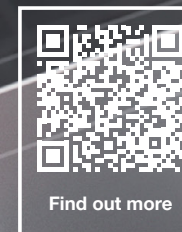


Laser Diffraction and Image Analysis Particle Analyzer

Litesizer DIF Series



Litesizer DIF: From First to Best



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

The best raw data

Litesizer DIF's best-in-class optical setup is designed to extract the most precise data, even from the smallest sample volumes.

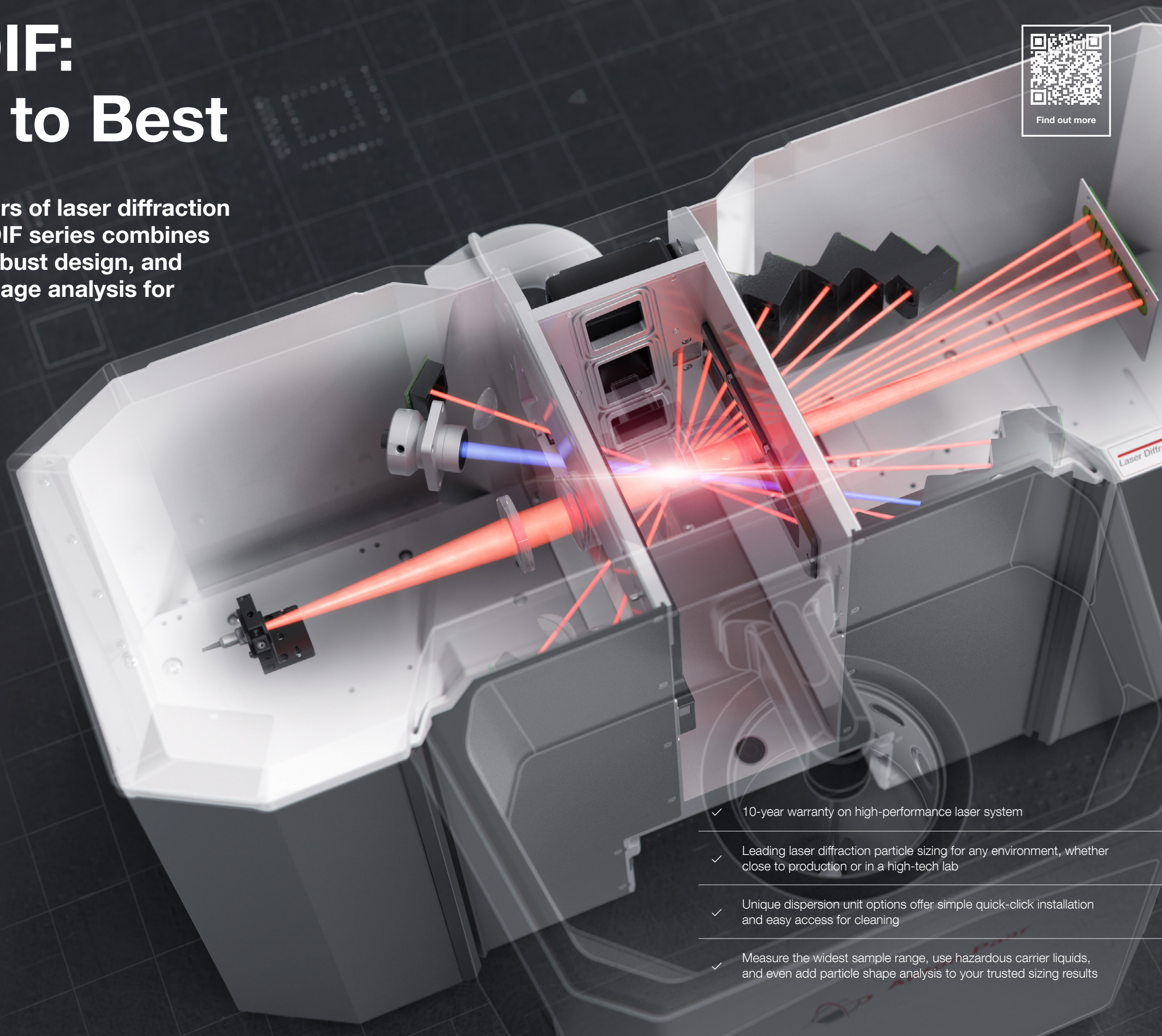
- Dual solid-state lasers: A powerful 10 mW red and 25 mW blue laser delivers robust performance without warm-up, supporting measurements with minimal sample quantities and short acquisition times – perfect for sensitive or precious materials
- Ultra-wide detection angle: From 0.01° to 170°, Litesizer DIF 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 complements laser diffraction with dynamic image analysis – ideal for quick particle shape analysis and outlier detection

Built to last

Every element of Litesizer DIF 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 seals and an additional dust shield protect sensitive optics, maintaining peak performance even in challenging conditions

- ✓ 10-year warranty on high-performance laser system
- ✓ 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



Liquid Flow and Small Flow

Characterize suspensions, emulsions, or solid-state particles with a variety of liquid dispersion options.

	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	0.01 µm to 2,500 µm	0.01 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) 20 kg (44.1 lbs) with Imaging	16.3 kg (35.9 lbs) 19.6 kg (43.2 lbs) with Imaging

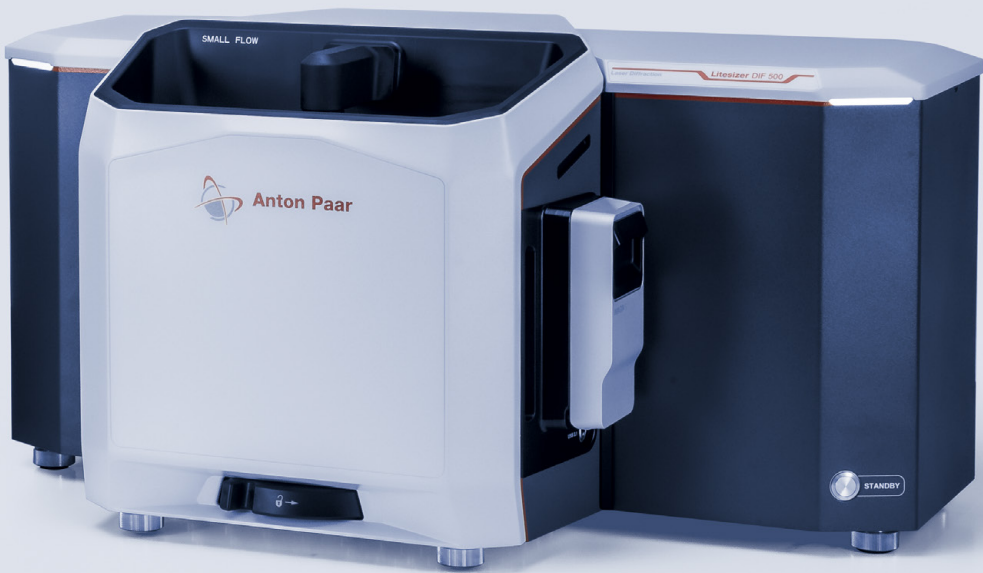
1) For detailed chemical compatibility and wetted parts, please refer to the instruction manual
2) Litesizer Filling System might be necessary
3) Not available in options with high chemical resistance



Liquid Flow Imaging and Small Flow Imaging

The Liquid Flow Imaging and Small Flow Imaging Units add shape analysis to the Litesizer DIF series instruments to create a perfect bridge between laser diffraction and dynamic image analysis technologies. Building on the capabilities of the Liquid Flow and Small Flow Dispersion Units, they are ideal for applications requiring simultaneous size and shape information, sample troubleshooting, and outlier detection.

- ✓ 20 different size and shape parameters for every particle above 5 µm
- ✓ Laser diffraction and dynamic image analysis in one operating software
- ✓ Signature software features such as particle matrix representation and particle filtering
- ✓ No interference between laser diffraction and dynamic image analysis measurement data



Dry Jet Dispersion Unit

Break apart even the most stubborn dry agglomerates.

Dry Jet Dispersion Unit	
Description	Dispersion unit for deagglomerating dry materials
Dispersion means	Vibration and compressed air (pressure from 0.05 bar to 4.6 bar)
Measurement range	Up to 3,500 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)



Litesizer Autosampler

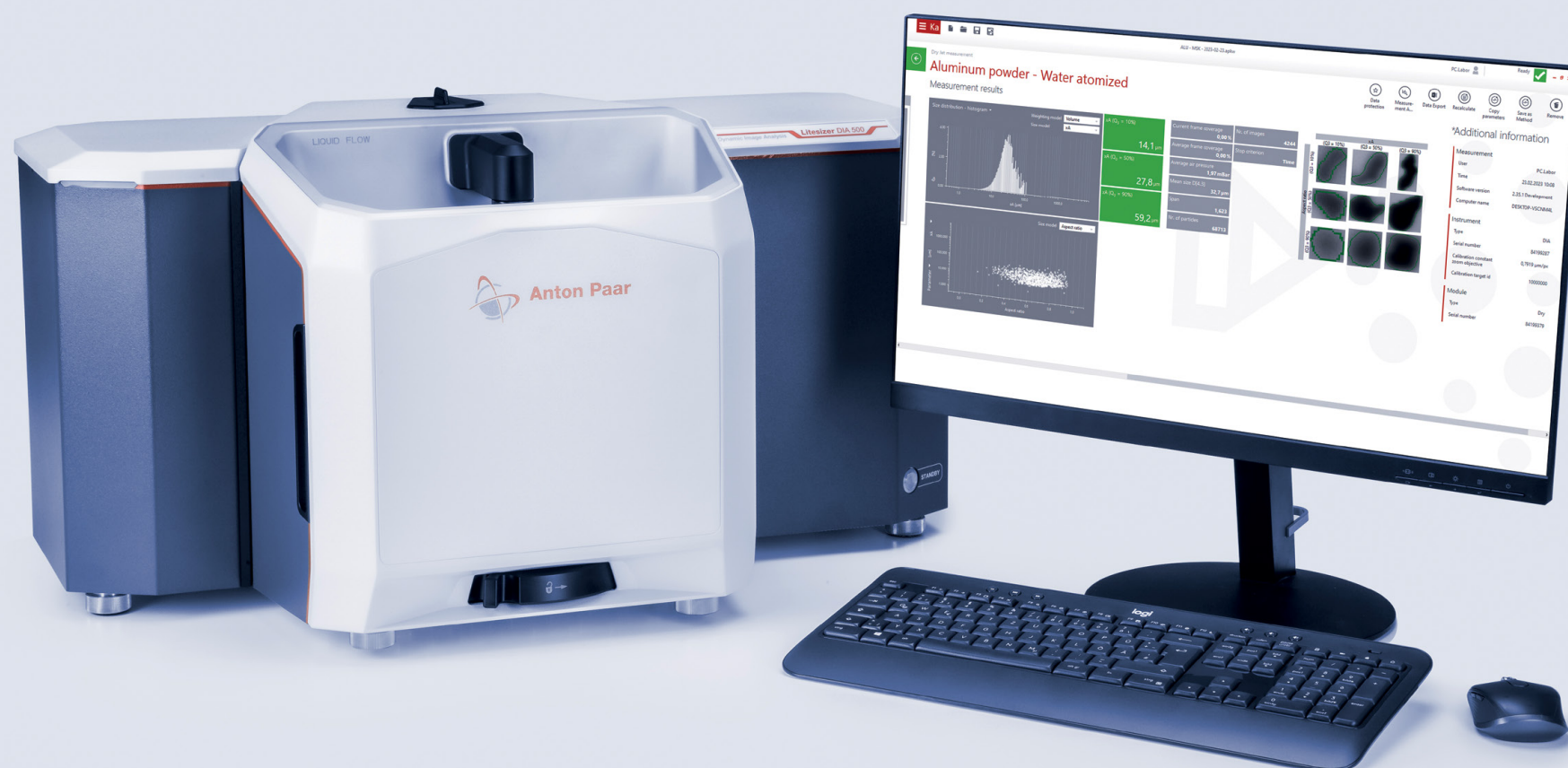
The Litesizer Autosampler automates particle size and shape analysis. It offers reliable automation for both industrial and laboratory environments.

- ✓ Process up to 60 samples per cycle with automatic sample intake
- ✓ Set up a run and add and prioritize samples anytime – all done in Kalliope
- ✓ Compatible with both liquid and dry 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



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

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 in compliance 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, in compliance 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

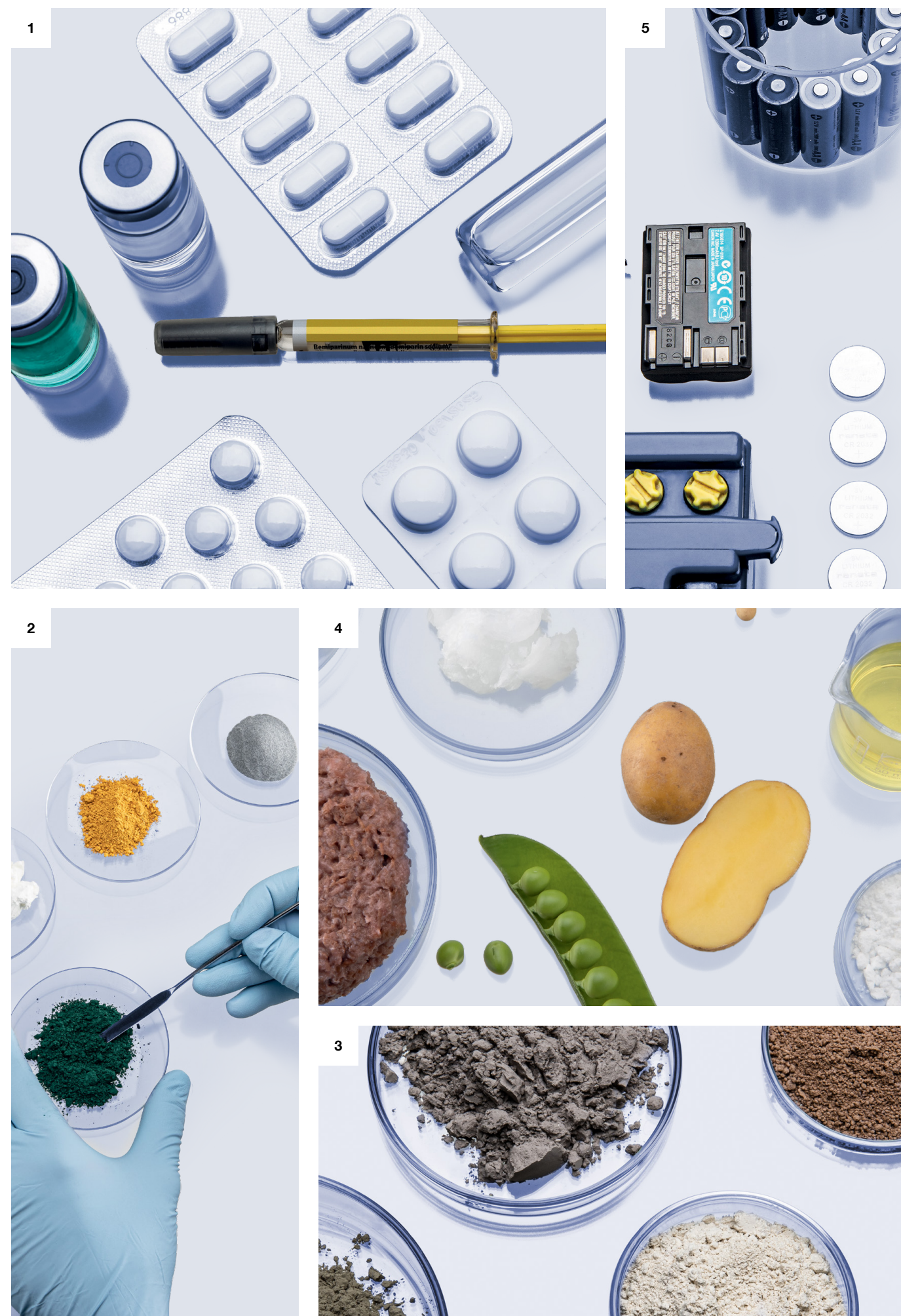
Taste, mouthfeel, and solubility depend heavily on particle characteristics.

- 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 DIF 500	Litesizer DIF 300	Litesizer DIF 100
Specifications			
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		
Wavelength	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	-	
Wavelength	450 nm, blue	-	
Power	25 mW	-	
Laser class	Class 1 (IEC 60825-1)	-	
Detectors			
Type	Log-spaced photodiode 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 size			
Instrument 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)		
Instrument weight	42.3 kg (93.2 lbs)		
Operating conditions			
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			

^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.

Extensive Application Support

If you are unsure of your measurement or data, Anton Paar's team of particle specialists will provide you with application support until you are confident using your instrument.



Reliable. Compliant. Qualified.

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

