

BeScan Lab+ | ADVANCED STABILITY ANALYZER

See Beyond Stability. Decide with Intelligence.
AI-powered profiling for formulation stability analysis

Bettersize
BETTER PARTICLE SIZE SOLUTIONS

BeScan Lab+

— Faster. Smarter. Without Compromise.

BeScan Lab+ is a next-generation stability analysis platform based on Static Multiple Light Scattering (SMLS) technology. By performing continuous vertical scanning of transmitted and backscattered light in real time, it delivers true in-situ, non-destructive monitoring of dispersions from highly dilute samples to highly concentrated systems of up to 95% v/v.

It is an indispensable tool for diverse industries, from pharmaceuticals and food and beverage to cosmetics, agrochemicals, paints and coatings, and emerging energy materials.

With sensitivity more than 200 times greater than visual observation, BeScan Lab+ detects early-stage instabilities, such as creaming, sedimentation, flocculation, coalescence, and phase separation. An integrated AI engine analyzes instability patterns to provide deeper insights, accelerate decision-making, and enhance advanced formulation development and quality control.



BeScan Lab+ Provides

- Backscattering and Transmission Profiles
- Instability Index (I_{US})
- Particle Size and Particle Size Distribution
- Homogeneity Index
- Kinetic Parameters
- Photon Mean Free Path Analysis
- AI-Powered Analysis

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Features & Benefits

Native-State Analysis

Non-Destructive Measurement
Preserves the sample's original state with non-contact, dilution-free, and shear-free analysis.

Exceptional Concentration Range
Accurately measures sample dispersions from very dilute up to 95% volume fraction.

Broad Particle Size Range
Supports particle sizes from 0.01 to 1,000 µm, enabling reliable analysis of both nano- and micro-scale dispersions.

High-Precision & High-Throughput Hardware

Ultra-Sensitive Optical System
Achieves up to 200× greater sensitivity than visual inspection, enabled by precise 20 µm vertical scanning step.

Scalable, High-Throughput Testing
Supports simultaneous connection of up to 10 units, dramatically increasing testing capacity and efficiency.

Advanced Temperature Control
Features a wide operating range from 10 °C below ambient up to 80 °C, ensuring reliable performance under controlled thermal conditions.

Intelligent Data Analysis & Comprehensive Profiling

Quantitative Stability Metrics
Utilizes Instability (I_{US}) and Homogeneity (RSD) indices to precisely quantify stabilization and destabilization kinetics.

Mechanism & Particle Size Analysis
Identifies instability mechanisms (e.g., creaming, sedimentation) while delivering real-time, in-situ particle size distribution (PSD) analysis.

AI-Powered Diagnostics & Traceability
AI-driven analysis diagnoses root causes of instability and recommends formulation improvements, supported by barcode-based sample tracking for streamlined data management.

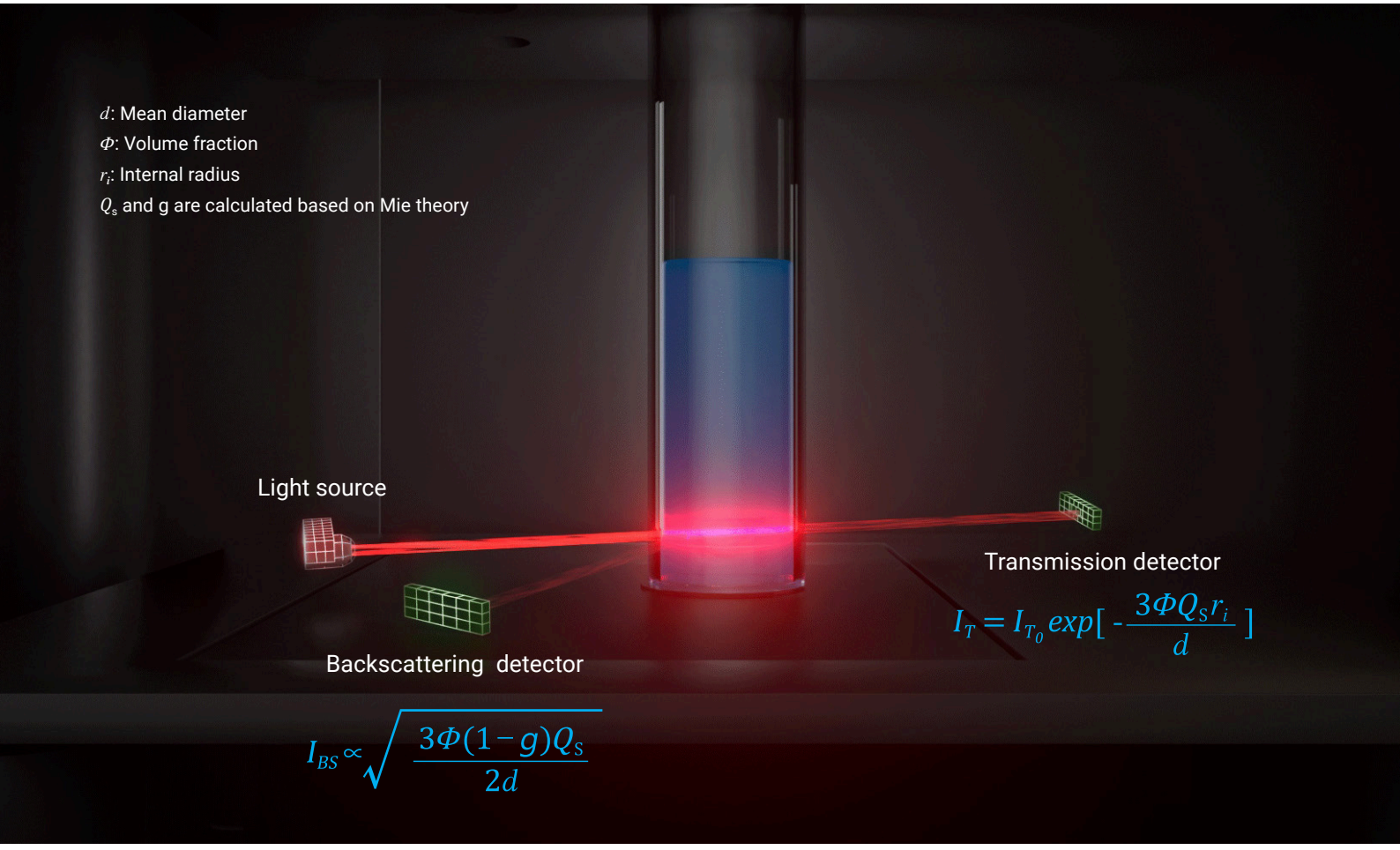
The Power of Static Multiple Light Scattering (SMLS)

BeScan Lab+ employs an 850 nm near-infrared LED light source with synchronized 0° transmission and 135° backscattering detectors. Its optical head scans the sample vertically at 20 µm resolution, continuously capturing changes in light intensity as a function of both height and time.

This approach reveals the spatial distribution and kinetic evolution of particles or droplets in their true undisturbed state, providing a robust foundation for accurate, reproducible stability assessment.

Features

- Broad compatibility across a wide range of sample colors and viscosities, supporting systems from extremely dilute to highly concentrated formulations (up to 95% v/v).
- True non-destructive, in-situ analysis with no dilution or sample pretreatment.
- Wide particle size coverage from 0.01 to 1000 µm.
- Suitable for emulsions, suspensions, foams, and other complex dispersion systems, delivering high stability assessment accuracy and resolution.



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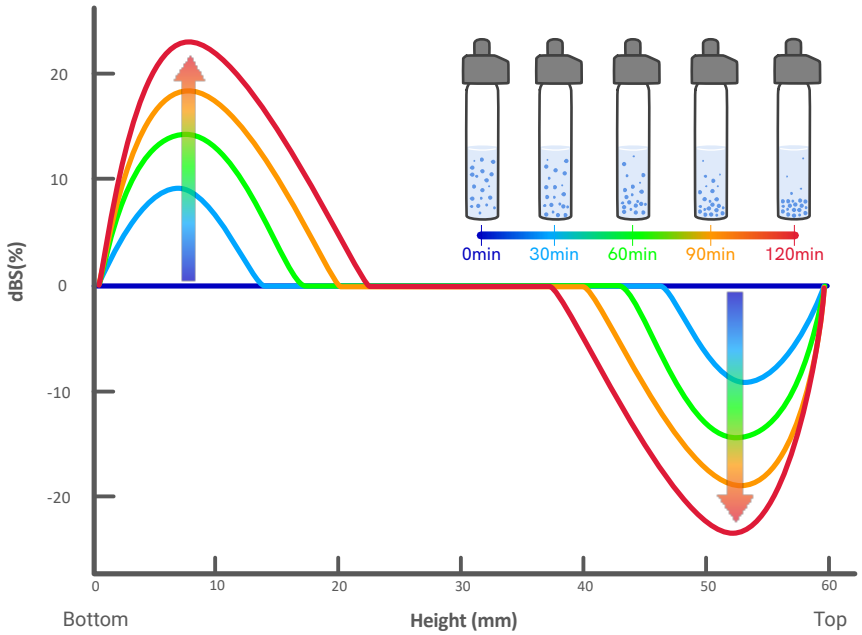
From Optical Signal to Stability Insight

The BeScan Lab+ supports fully customizable scan programs, with each scan displayed as an overlaid color-coded profile. By comparing curves collected at different time points, users can clearly visualize how optical signals evolve with both height and time, making it easy to detect localized instability and understand separation behavior.



What Signal Interpretation Reveals

- Where instability first emerges within the sample
- Whether particles or droplets migrate upward or downward
- How rapidly separation develops over time
- Which instability mechanism is most likely involved

For example, during sedimentation, the backscattering signal typically decreases in the upper region while increasing in the lower region, directly reflecting downward particle migration and accumulation at the bottom layer.

Why It Matters

Signal interpretation transforms complex optical data into actionable understanding, linking real-time measurements to faster, better-informed scientific and quality decisions.

AI-Driven Instability Diagnosis

Make complex data easier to interpret — and faster to act on.

Interpreting stability data traditionally relies on experience, time, and consistent expertise across teams. The BeScan Lab+ addresses these challenges with an integrated AI-powered interpretation engine that transforms complex optical data into clear, decision-ready insight.

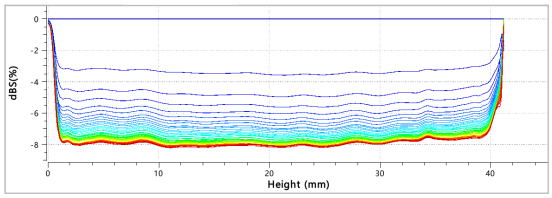
By combining signal evolution patterns with industry context and sample type, the system automatically identifies likely instability behaviors and supports root-cause analysis. This reduces reliance on manual interpretation and enables teams to reach conclusions faster, more consistently, and with greater confidence.

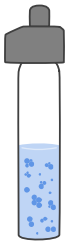
What AI Brings to Your Workflow

- Faster, more intuitive data interpretation
- Standardized analysis across users and teams
- Reduced dependence on expert-only judgment
- More efficient formulation screening
- Stronger support for optimization and QC decisions

Examples of AI-Identified Instability Behaviors

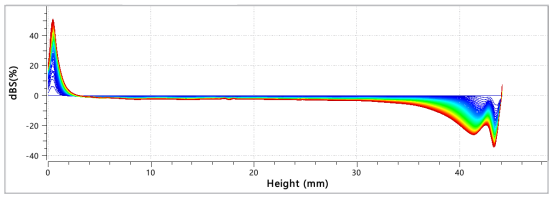
Droplet coalescence in cosmetic emulsions

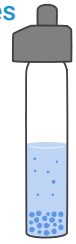




AI Analysis	
Instability Index	Total: 7.0 / Bottom: 6.7 / Middle: 7.4 / Top: 6.8
Phenomenon	Aggregation, both bottom and top concentrations stable, but particle flocculation/aggregation occurs within the system.

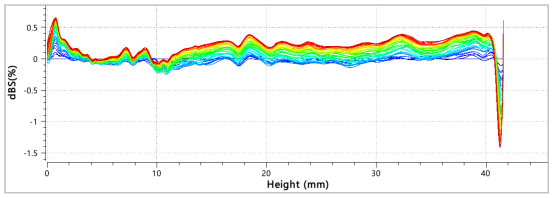
Sedimentation and agglomeration in CMP slurries





AI Analysis	
Instability Index	Total: 4.0 / Bottom: 3.2 / Middle: 1.7 / Top: 7.1
Phenomenon	Sedimentation with Top Clarification and Aggregation, bottom concentration increased, top concentration decreased, accompanied by particle aggregation.

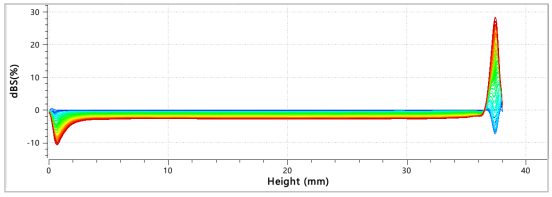
Sedimentation and gelation in battery slurries

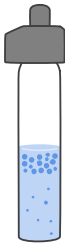




AI Analysis	
Instability Index	Total: 0.1 / Bottom: 0.1 / Middle: 0.1 / Top: 0.2
Phenomenon	Sedimentation with Top Clarification and Aggregation, bottom concentration increased, top concentration decreased, accompanied by particle aggregation.

Creaming in food emulsions





AI Analysis	
Instability Index	Total: 1.5 / Bottom: 1.5 / Middle: 1.3 / Top: 2.0
Phenomenon	Bottom Clarification with Creaming and Aggregation, bottom concentration decreased, top concentration increased, accompanied by particle aggregation.

The result: stability testing evolves from passive observation into intelligent decision support, accelerating development and improving confidence at every stage.

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Quantify Stability with the Instability Index

One metric. Objective comparison. Confident decisions.

The Instability Index (I_{US}) is the core quantitative output generated by the BeScan Lab+. Derived from time-dependent optical signal changes across the entire sample height, I_{US} translates complex destabilization behavior into a single, clear and comparable metric.

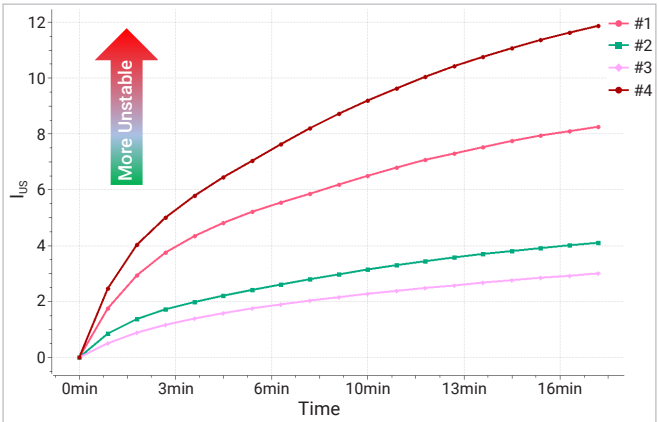
Higher I_{US} values indicate lower stability, enabling rapid, objective assessment across formulations, batches and conditions.

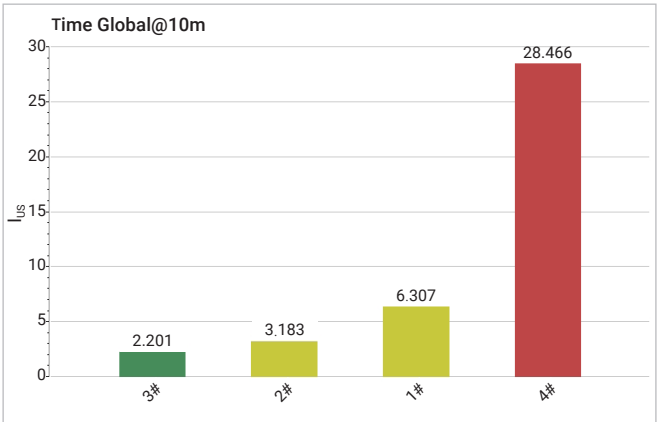
Why I_{US} Matters

- Enables objective quantitative stability comparison
- Simplifies formulation ranking and screening
- Supports batch-to-batch benchmarking
- Tracks stability trends in real time
- Strengthens data-based release and optimization decisions

How It Supports Better Decision Making

- Compare multiple samples on a single consistent scale
- Quickly identify the most and least stable formulations
- Track how stability evolves over time
- Detect instability well before visible failures occur
- Establish consistent evaluation standards across teams





Detect instability earlier. Optimize sooner, before failure becomes visible.

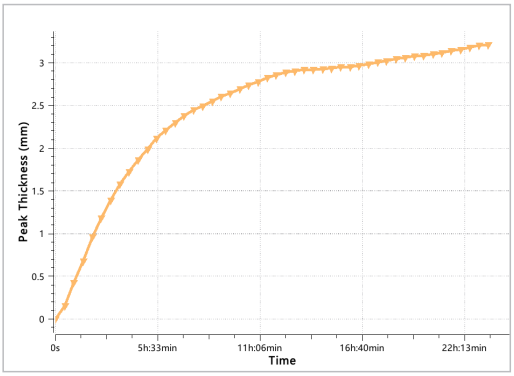
From Data to Decisions

Go beyond detection. Build deeper understanding. Make better decisions.

The BeScan Lab+ links macroscopic instability to microstructural evolution and kinetics, enabling users to move from signal interpretation to actionable formulation strategy.

Average Particle Size & Migration Kinetics

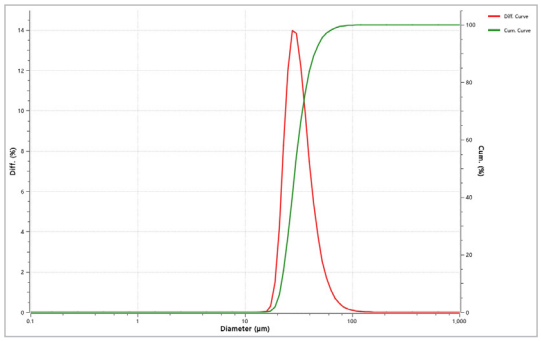
Tracks interface movement and calculates particle or droplet migration rates over time.



Migration Rate		Edit	
Start Time	0 d	4 h	38 m
End Time	0 d	18 h	30 m
Migration Rate	0.08 mm/h		

Sedimentation Particle Size Distribution

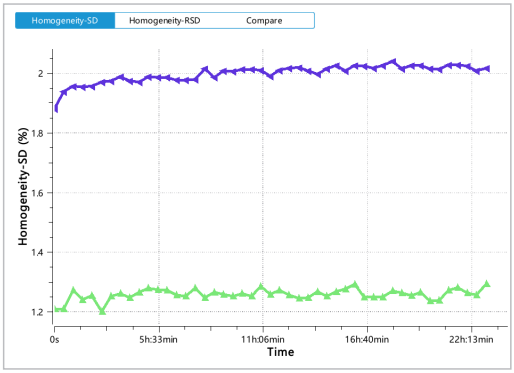
Monitors time-dependent changes in transmitted light and applies Stokes' Law and Beer's Law to determine particle size distribution without dilution.



Particle Size Results	
D_{10}	22.897 µm
D_{50}	30.812 µm
D_{90}	46.768 µm
Span	0.775

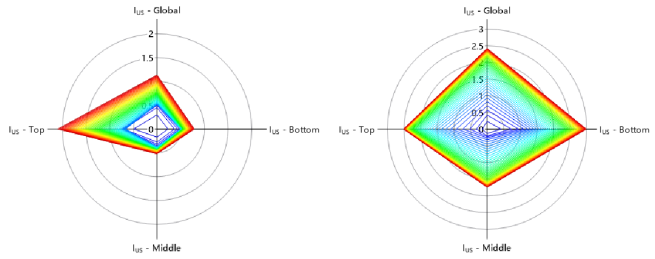
Homogeneity Index

Quantifies vertical concentration uniformity using standard deviation (SD) and relative standard deviation (RSD) across the full sample height.



Stability Radar Chart

Integrates Instability Index (I_{US}) values from the top, middle, bottom, and overall sample zones to rapidly identify the most unstable regions.



From raw optical signals to confident formulation decisions — the BeScan Lab+ delivers the complete stability picture.

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Application Industries

Broad Application Coverage

The BeScan Lab+ supports a wide range of dispersion systems where stability is critical, serving diverse industries and formulation challenges.

Agrochemicals



Suspension concentrates, emulsions, microcapsules

Batteries & Energy



Anode/cathode slurries, CMP slurries

Ceramics



High-solid slurries, glazes

Cosmetics & Personal Care



Creams, lotions, sunscreens, cleansers, foundations, nail polish

Food & Beverage



Dairy products, plant-based drinks, sauces, stabilizers

Petrochemicals



Crude oil emulsions, drilling fluids, lubricants

Pharmaceuticals



Injectables, vaccines, suspensions, drug delivery systems, syrups

Coatings, Dyes & Inks



Water- and solvent-based formulations, pigment dispersions

Flexible Accessories for Extended Testing Needs

Designed for real-world laboratory and industrial workflows, the BeScan Lab+ easily adapts to diverse sample types and testing conditions. A range of flexible accessories extends capability while maintaining ease of use and measurement reliability.



Coring Sample Cell

Optimized for high-viscosity pastes, creams, and foams



Low-volume Sample Cell

2–4 mL capacity, ideal for precious or limited-volume samples



Cooling Module

Extends temperature control down to 10°C below ambient temperature



Low-speed Centrifuge

Ensures flat meniscus formation and bubble-free preparation for viscous samples

Full Lifecycle Stability Solutions

The BeScan Lab+ supports the entire product lifecycle by helping teams detect risk earlier, optimize faster, and control quality with greater confidence.

Stability is not a single checkpoint. It is a continuous challenge that directly impacts development speed, manufacturing consistency, shelf-life reliability, and in-use performance.

The BeScan Lab+ enables proactive, quantitative, and actionable stability management — from raw material selection to end-user application.



Formulation Development

Raw Material Screening & Formulation Optimization

Typical challenge

Too many variables, too many formulation candidates, and heavy reliance on slow, subjective visual comparison.

What the BeScan Lab+ reveals

Early-stage stability differences between raw materials, suppliers, additive systems, and formulation ratios – enabling faster screening and smarter formulation decisions.



Quality Control & Process Optimization

Batch Consistency and Release Testing

Typical challenge

Changes in process parameters or batch variability can compromise long-term stability, even when products appear acceptable in the short term.

What the BeScan Lab+ reveals

Subtle stability differences driven by process conditions such as mixing intensity, emulsification time, and temperature – supporting robust process control and batch-to-batch consistency.



Storage & Transport Simulation

Shelf-Life Prediction & Environmental Stress Testing

Typical challenge

Storage and transport conditions can trigger separation, sedimentation, or structural change over time.

What the BeScan Lab+ reveals

How instability develops under different temperature and time conditions, enabling realistic simulation of storage, transport, and shelf-life scenarios.



Application Performance

Redispersibility & In-Use Performance

Typical challenge

A product may remain stable during storage but fail to redisperse or perform as expected during real-world use.

What the BeScan Lab+ reveals

Whether a system can redisperse effectively after shaking, dilution, or sonication – ensuring consistency and performance at the point of application.

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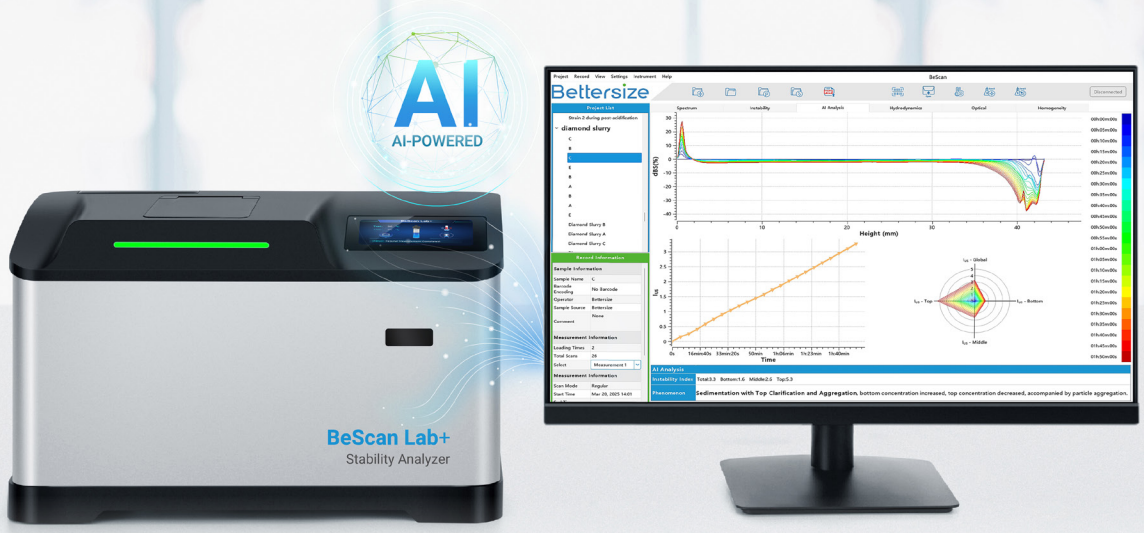
Integrated Stability Platform

The BeScan Lab+ also integrates with the broader Bettersize portfolio to deliver a deeper, more connected understanding of both internal and external stability factors.

When combined with BeNano, Bettersizer, BetterPyc 380, BeSEC, and BeVision, users can build a comprehensive and data-driven stability workflow spanning formulation, processing, structure, and performance.





BeScan Lab+

Stability
Particle size
Homogeneity



BeNano Series

Nanoparticle size
Zeta potential



BetterPyc 380

True density
Solid content



BeSEC

Molecular weight



Bettersizer 2600 Plus

Particle size distribution



BeVision D3 Series

Particle size
Particle shape

Specifications	
Principle	SMLS (Static Multiple Light Scattering)
Light Source	850 nm LED
Detection Angles	0° & 135°
Scanning Step	20 µm
Scanning Height	0 - 60 mm
Sample Volume	2 - 25 mL
Sample Concentration*	95% vv
Particle Size Range	0.01 - 1,000 µm *
Temperature Range	RT - 10 °C to 80 °C (±0.5 °C)**†
Multi-Unit Connection	Up to 10 units with a single software platform
Measurement Modes	Regular / Fixed Point / Temperature Trend
Operating Environment	20 - 30°C, 10 - 80% RH
Dimensions	460 × 260 × 280 mm
Weight	13.5 kg
Power Supply	AC 100 - 240 V, 50 - 60 Hz, 3.8 A
Compliance	ISO/TR 18811:2018, ISO/TR 13097:2013, ISO/TS 21357:2022, ISO/TS 22107:2021, ISO 13317-3:2001, GB/T 38431- 2019

* Depends on sample properties and preparation.

** Testing below room temperature requires an external cooling device.

† For operation below room temperature, maintain ambient relative humidity below 20%.

Bettersize

BETTER PARTICLE SIZE SOLUTIONS

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