Bettersize
BETTER PARTICLE SIZE SOLUTIONS

BeVision S1

Big Vision for Small Particles

PARTICLE SIZE

PARTICLE SHAPE

BeVision S1

Big Vision for Small Particles

The BeVision S1 offers an easy solution to measure and analyze the size and shape of particles in a range of 1 - 3,000 µm. It is easy to use while staying reliable and accurate.

The BeVision software offers 24 different particle size and shape parameters and further organizes the data into an all-around validation of particles.

The BeVision S1 is not only a reliable independent particle size and shape analyzer, but it can also be a perfect match for laser diffraction particle analyzers, as an aid or a verification.

With high magnification up to **4,000** times*

**Includes digital magnification*

A **high - resolution** CMOS camera

Particles as fine as **1 micron**

can be captured and analyzed

Features and Benefits

- Measurement range: **1 - 3,000 µm**
- **24** different particle size and shape parameters
- **Optional** models for different applications
- Both **dry and wet** measurements
- Results in compliance with **ISO 9276 - 6**
- A **budget - friendly** solution for your particle analysis
- **Powerful software** eases your work
- **Customizable** reports for different evaluation options

Why **Image Analysis** Method?

Easy

Capture an image of particles, identify particles, then measure their size and shape. Every step of image analysis is easy and clear.

Shape analysis

Based on a direct view of particles, it is possible to analyze not only the size of particles, but also their shape.

Seeing is believing

The image analysis method determines the size and shape of every individual particle and then sums it up to form a statistic. Details of particle size or shape distribution can be accurately provided.

Why **Static** Image Analysis Method?

Clear vision

In static image analyzers, precision microscopes and high-resolution cameras are specialized for high - quality particle images.

Undersized particle sensitivity

The static image analysis method is sensitive to undersized particles; it is even possible to estimate the size of undersized particles.

Small sample volume

The static image analysis method requires a small volume of samples. A few drops of emulsions or a few micrograms of powders are enough to do a measurement.

BeVision Series: Precision in Particle Vision

BeVision S1

Classical and versatile static image analyzer for wet and dry measurements.

BeVision M1

Automated static image analyzer for wet and dry measurements.

BeVision D2

Dynamic image analyzer for dry measurement.

	Static Image Analysis		Dynamic Image Analysis
	BeVision S1	**BeVision M1**	**BeVision D2**
Measurement range	1 - 3,000 µm	1 - 10,000 µm	30 - 10,000 µm
Particle shape analysis	●●●	●●●	●●●
High-resolution for narrow distributions	●●●	●●●	●●●
Accuracy for broad distributions	●	●●	●●●
Reproducibility	●	●●	●●●
Small sample volume for a single analysis	●●●	●●	●
Undersized particles detection	●●●	●●	●
Oversized particles detection	●	●	●●●
Simple operation and measurement efficiency	●●	●●●	●●●
Individual particle analysis	●●●	●●●	●●

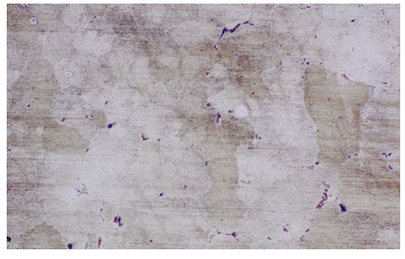
BeVision S1 Optional Models

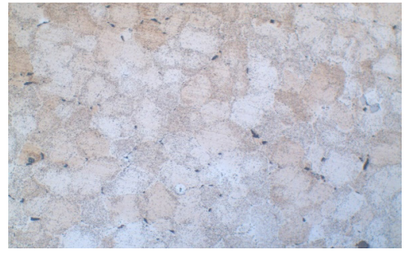
Transmitted light illumination (Standard model)

Equipped with a transmitted light source, the BeVision S1 can observe and analyze particles effectively for most applications. The standard model BeVision S1 is widely used in different industries, e.g., chemicals, minerals, ceramics, and polishing agents.

Reflected light illumination

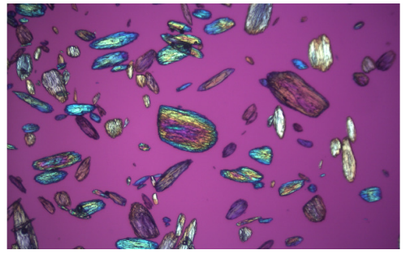
The optional reflected light source of the BeVision S1 can help measure particles dispersed in opaque mediums or on opaque surfaces, e.g., particles on filter paper or filter film, and metal powders embedded in metallographic samples.

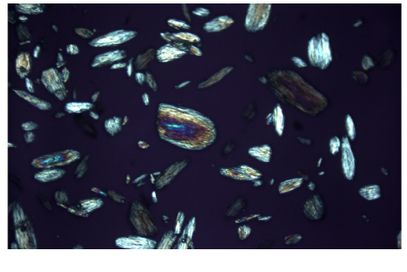




Polarized light illumination

Equipped with polarizing plates, the BeVision S1 provides users with particle size and particle shape analysis under polarized light. The polarized light model BeVision S1 is trusted by researchers and engineers in the field of biology, pharmacy, medicine, geology, mining, etc.





Particle Size and Shape **Parameters**

Size parameters

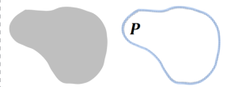
Equivalent diameters:
area-equivalent diameter
perimeter-equivalent diameter

Feret diameters:
maximum and minimum Feret diameters, x_{LF} ("length")

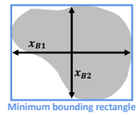
Martin diameters:
maximum and minimum Martin diameters

Legendre ellipse:
major and minor axes

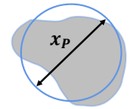
A: projected area of the particle



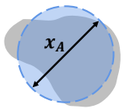
P: length of the projected contour



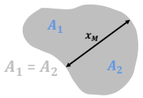
x_{B1} , x_{B2}: long and short diameters



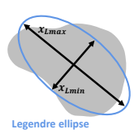
x_P: perimeter- equivalent diameter



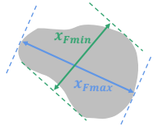
x_A: area- equivalent diameter



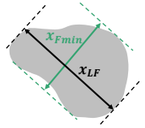
x_M : Martin diameter



x_{Lmax} , x_{Lmin}:
lengths of the major and minor axes



x_{Fmax} , x_{Fmin}:
maximum and minimum Feret diameters



x_{LF} : Feret diameter perpendicular to the minimum Feret diameter

Shape parameters

Size difference in 2 directions:
aspect ratio
L/W ratio
ellipse ratio

Round-likeness and rectangle-likeness:
circularity
irregularity
compactness
extent
box ratio

Contour concavity:
concavity
convexity
solidity

For elongated particles:
elongation
straightness

$$Aspect\ ratio = \frac{x_{Fmin}}{x_{Fmax}}$$

$$L/W\ ratio = \frac{x_{B1}}{x_{B2}}$$

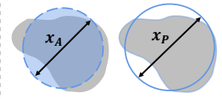
$$Ellipse\ ratio = \frac{x_{Lmin}}{x_{Lmax}}$$

$$Compactness = \frac{x_A}{x_{Fmax}}$$

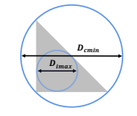
$$Extent = \frac{A}{x_{Fmax} \times x_{Fmin}}$$

$$Concavity = \frac{A_C - A}{A_C}$$

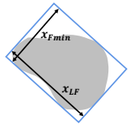
$$Solidity = \frac{A}{A_C}$$



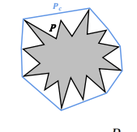
$$Circularity = \frac{x_A}{x_P}$$



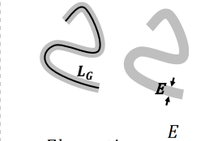
$$Irregularity = \frac{D_{imax}}{D_{cmin}}$$



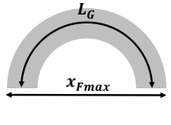
$$Box\ ratio = \frac{A}{A_{box}} = \frac{A}{x_{LF} \times x_{Fmin}}$$



$$Convexity = \frac{P_C}{P}$$



$$Elongation = \frac{E}{L_G}$$



$$Straightness = \frac{x_{Fmax}}{L_G}$$

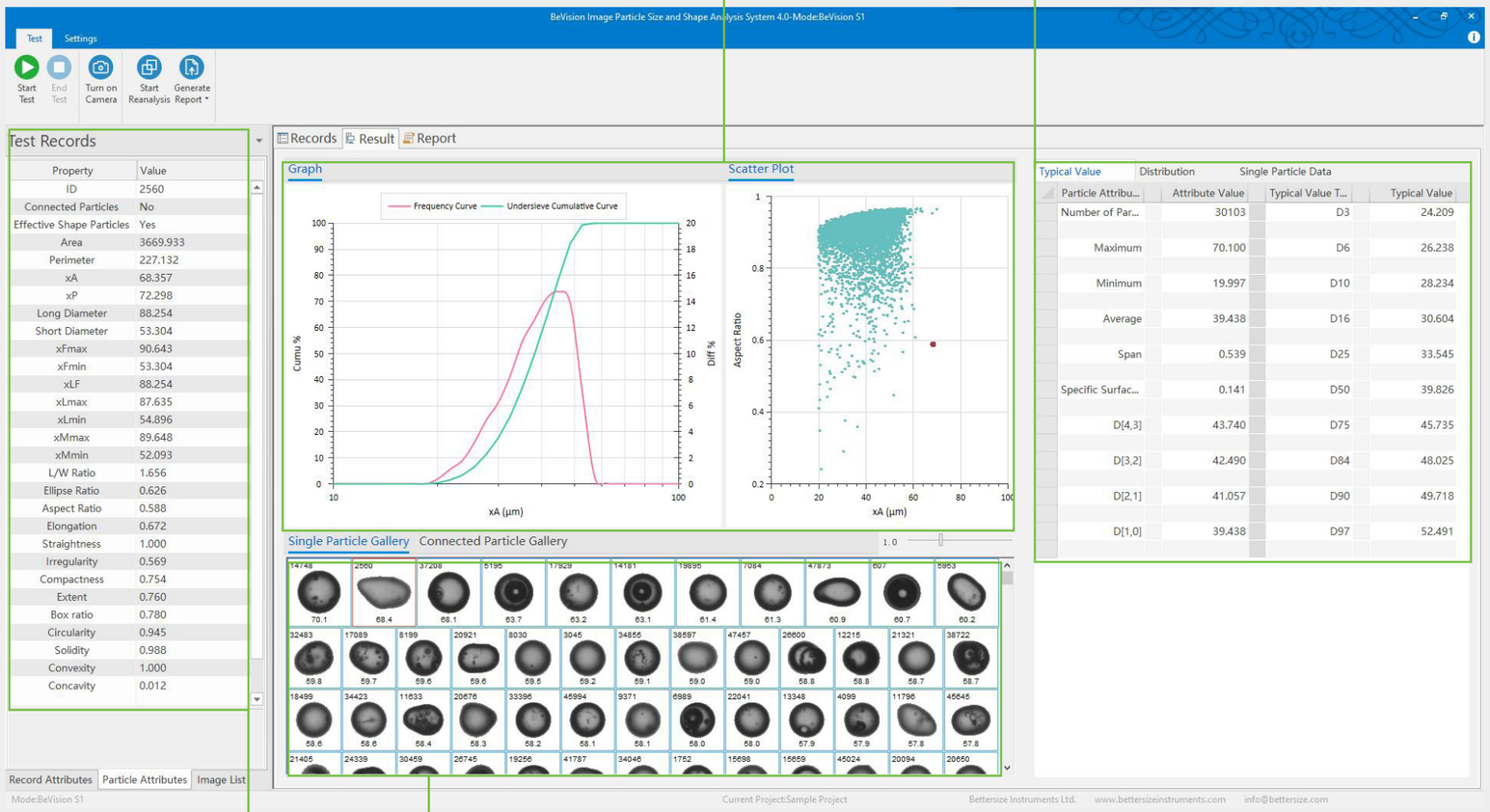
BeVision Software: Visualized Insights for You

Distribution in total

Distribution curves and charts present particle size and shape distributions, and the scattering plot shows the relationship between two different particle size and shape parameters. All these charts, curves, and tables are customizable.

Distribution in summary

The BeVision software offers statistics and typical values to describe particle size and shape distributions, e.g., the D[1,0], span value, and D90. And the typical value chart is customizable.



Particle details

For irregularly shaped particles, it is hard to describe their size with a single dimension. Scanning over 180 different directions of each particle projection, the BeVision software is able to precisely analyze particles, and present the particle size and shape in 24 different parameters. The size and shape parameters are in compliance with ISO 9276-6.

Locate particles

The BeVision software offers a single particle gallery that can be the direct way to locate particles with a specific appearance. Besides, the BeVision software allows users to find particles with specific characteristics, with a customizable filter.

Reproducible measurements

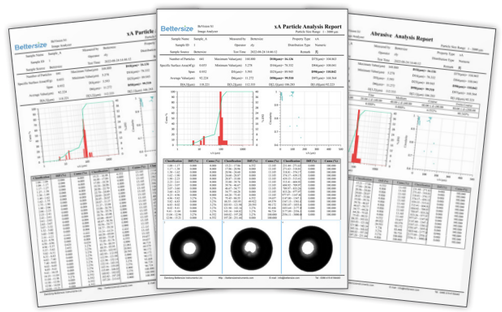
To ensure a reproducible result, the BeVision software can make a measurement automatically, following a saved standard operation procedure (SOP).

Comparable results

With the help of the BeVision software, it is possible to do a comparison among multiple records: particle size or shape distribution comparison, typical value comparison, etc.

Customizable reports

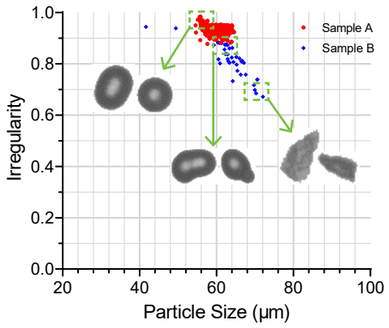
The BeVision series prepares various report templates for different evaluation options. Layouts and contents of report templates are editable and customizable.



Application Cases

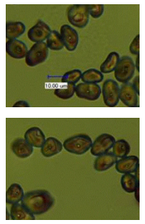
Glass beads

Glass beads are widely used in construction, traffic paint, sandblasting, etc. In this case, both size and shape of glass beads affect their griding effect. The BeVision S1 offers size and shape measurement results at the same time, helping the QC engineers achieve an insightful validation of glass beads products. A scatter plot showing the relationship between particle size and irregularity helps compare the shape distribution and the irregular particle concentration of samples A and B, and evaluates their quality.



Starch granules of *Treculia africana*

Just like other micro particles in the field of biology research, starch granules from different botanical sources present characteristic shapes, sizes, and morphologies. Accordingly, the BeVision S1 offers a flexible way to count the total number of particles and to analyze the size and shape of them automatically. For example, a BeVision S1 helps researchers from the University of Ibadan and Glyndwr University to analyze the size and shape of seed starch granules of *Treculia africana* and develop more insights into the starch manufacturing.

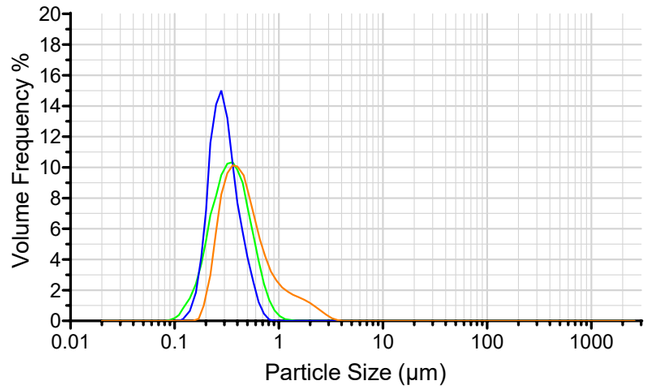


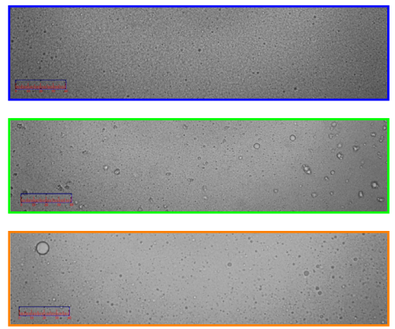
Granule characteristics				
Sample Number	TASS1	TASS2	TASS3	TASS4
Particle number	130	154	162	150
Maximum xA (μm)	11.64	10.11	13.6	11.59
Minimum xA(μm)	4.33	3.5	4.49	5.15
Average xA (μm)	7.93	7.02	7.77	7.79
Circularity	0.56	0.66	0.69	0.6

Image and size distribution of *Treculia africana* starch granules. Adopted from Nwokocha, L. M., Willams, P. A., Structure and properties of *Treculia africana*, (Decne) seed starch, *Carbohydrate Polymers*, 2009, (84), 395-401

Pharmaceutical lipid emulsions

Images provided by the BeVision S1 are persuasive support for the particle size distribution results of other sizing methods. Here, the particle size distribution curves from the Bettersizer 2600 show the trend of the particle size distribution of lipid emulsions after multiple homogenization processes. The BeVision S1 is a convincing tool when evaluating particle size results, and also a handy tool to ensure product quality.





Typical Applications

Agriculture

Abrasives

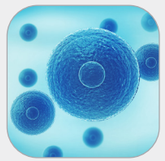
Paints, Inks & Coatings

Metal Powders

Pharmaceuticals

Mining and Minerals

Biology and Microorganisms



Ceramics

BT-910 Helps to Prepare Dry Powders

How does it help?

The BT-910 dry powder dispersion module generates a pre-set air pressure difference, which drives the dispersion airflow. The BT-910 aims to offer a reliable and reproducible dispersion method for dry powders.

Features and Benefits

- Reproducible dispersion
- No aggregates
- Even Dispersion

General	
Measuring principle	Static image analysis method
Parameters	Particle size, shape, and number
Measurement performance	
Measuring range	1 – 3,000 µm
Typical measurement time	3 to 5 min *
Number of size/shape classes	100 (user adjustable)
Special functions	SOP settings, analysis of saved images
Main device	
Optical lens	4×, 10×, 40×, 100× (with 40 × digital magnification)
Camera	5M Px CMOS camera
Light source	White light LED, Halogen lamp (optional)
System parameters	
Dimensions (L × W × H)	20.0 × 42.0 × 55.0 cm
Weight	8.0 kg
Supply voltage	100 / 240 V, 50 / 60 Hz
Software	
Conformity	ISO 13321, ISO 9276
Reports	Customizable reporting

* Sample and sample preparation dependent

BT - 910 dry powder dispersion module	
Dimensions (L × W × H)	23.5 × 16.5 × 26.6 cm
Weight	4.3 kg
Supply voltage	100 / 240 V, 50 / 60 Hz
Dispersion air pressure	≤ - 60 kPa

Bettersize

BETTER PARTICLE SIZE SOLUTIONS

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