Bettersize

BETTER PARTICLE SIZE SOLUTIONS

30TH ANNIVERSARY 1995-2025

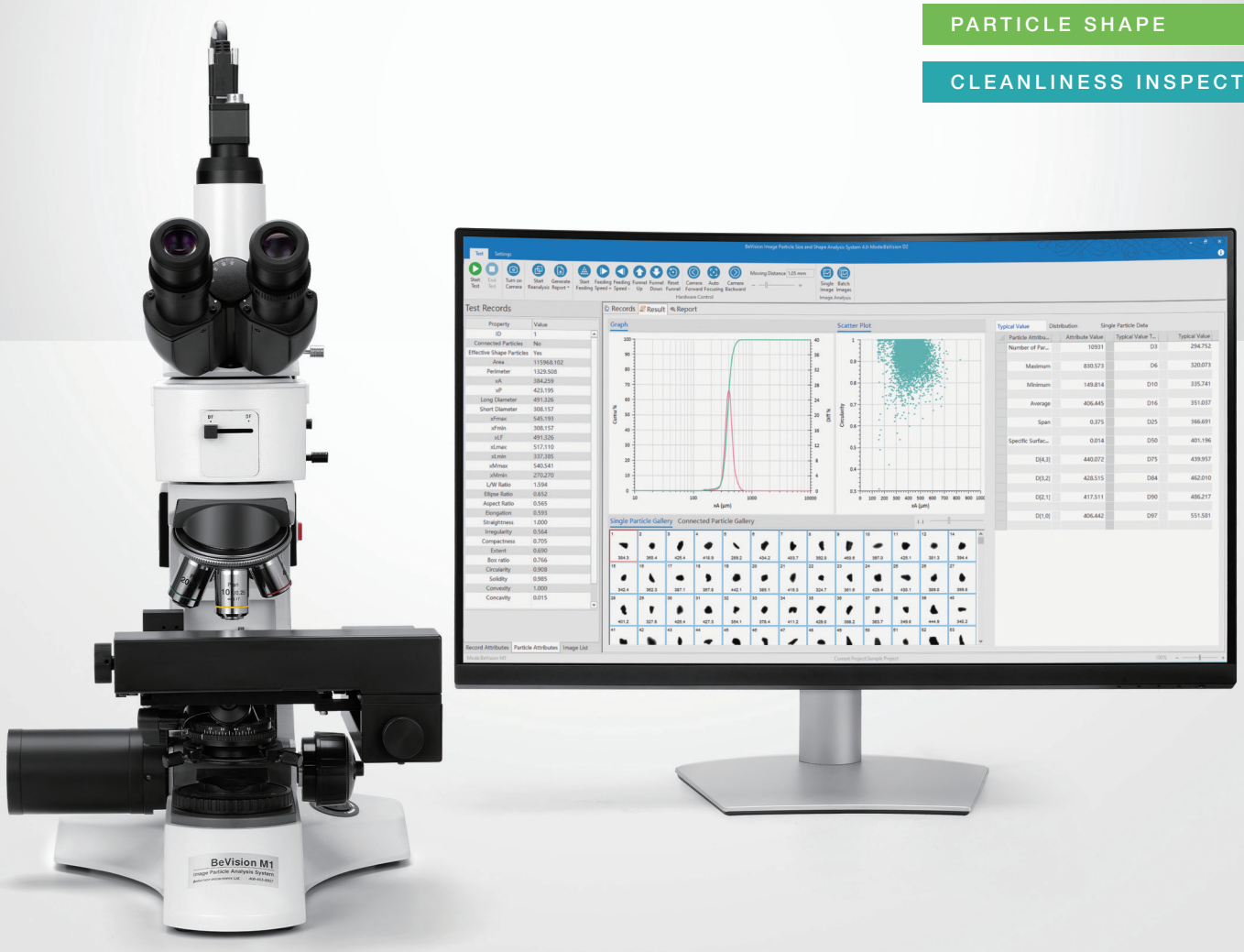
BeVision M1

Move Beyond Vision

PARTICLE SIZE

PARTICLE SHAPE

CLEANLINESS INSPECTION



BeVision M1: Move Beyond Vision

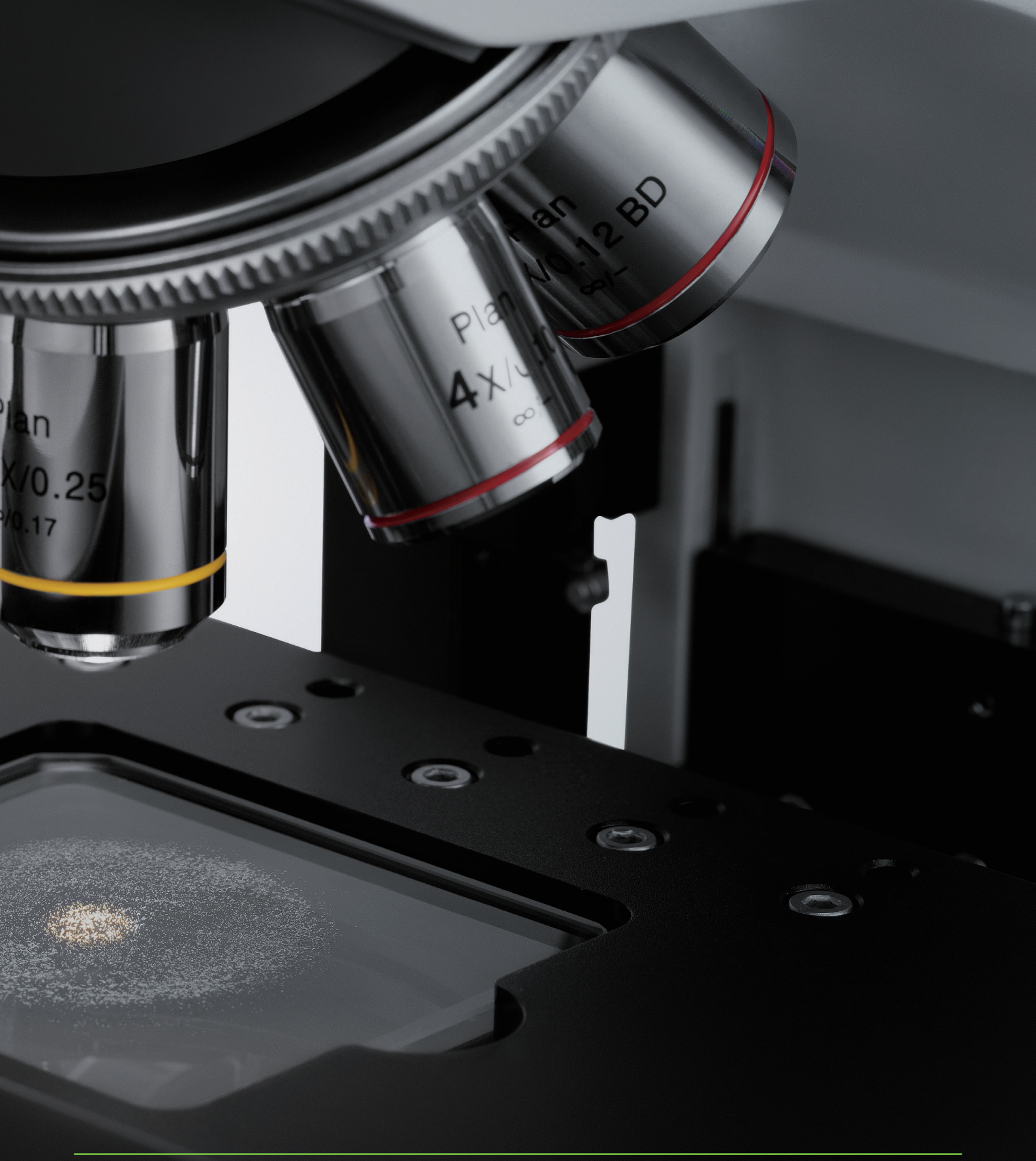
The BeVision M1 provides an accurate analysis of particle size and shape in the range of 0.3 - 10,000 µm. Besides, the BeVision M1 can be a vital part of the surface cleanliness test and film defects inspection.

Through the precise auto-scanning and auto-focusing, the BeVision M1 capture high quality images, offering a full view without particle loss and distortion.

The BeVision software helps you evaluate particle size and shape from 34 different aspects, and further organizes the data into an all - around validation of particles.

Features and Benefits

- Measurement range: **0.3 - 10,000 µm**
- Results in compliance with **ISO 9276 - 6**
- Highly **reproducible** measurements
- A 12Mpix **high-speed** CMOS camera
- **Powerful software** eases your work
- Precise **auto-scanning** and **auto-focusing**
- **34** different particle size and shape parameters
- **Easy** surface cleanliness and defects inspections



With high magnification up to

800 times*

**Includes digital magnification*

Automatic

measurements

Panoramic view

of centimeter-level regions

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.

BeVision D2

Dynamic image analyzer for dry powders and granules.

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.

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.

Shape analysis

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

Why **Static** Image Analysis Method?

Clear vision

In static image analyzers, precision microscopes and 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.

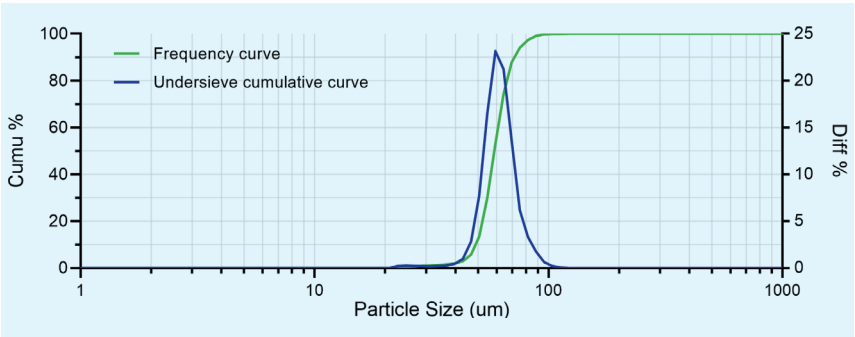
	Static Image Analysis		Dynamic Image Analysis
	BeVision S1	**BeVision M1**	**BeVision D2**
Measurement range	0.3 - 4,500 µm	0.3 - 10,000 µm	3.5 - 13,000 µm
Particle shape analysis	●●●	●●●	●●●
High-resolution for narrow distributions	●●●	●●●	●●●
Accuracy for broad distributions	●	●●	●●●
Reproducibility	●	●●	●●●
Small sample volume for a single analysis	●●●	●●	●
Undersized particles detection	●●●	●●	●
Oversized particles detection	●	●	●●●
Simple operation and measurement efficiency	●●	●●●	●●●
Individual particle analysis	●●●	●●●	●●

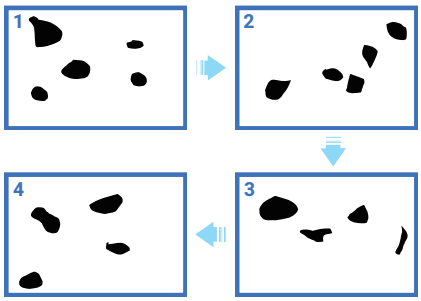
Efficient Scanning Mode and **Limit - breaking** Panoramic Mode

Scanning Mode

The workflow of the BeVision M1 scanning mode is to capture an image first, then analyze the image while moving the stage, capture the next image once the stage has reached a new position, and repeat.
The BeVision software will display real-time results during the scanning process. The scanning mode is widely welcomed in different industries with its efficiency and reliability.

Efficient and reliable scanning mode
Compared with the manual test, the automatic scanning process improves the test efficiency, doing the image capturing and stage moving simultaneously pushes the
efficiency to the next level. The efficient scanning mode analyzes many particles in one test, thus strengthening the statistical significance of the result.



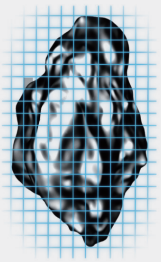


Features and benefits

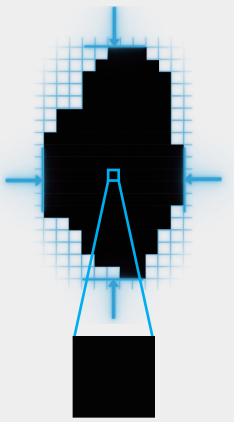
- Automatic scanning measures size and shape results fast and conveniently.
- High-precision motion control guarantees less particle loss and no repeated capture.

Particle Size and Shape **Parameters**

A 3-D particle

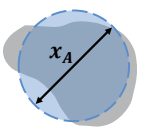


The 2-D Projection

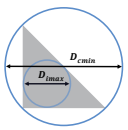


A Pixel

Compliance with
ISO 9276 - 6

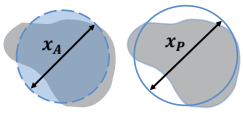


x_A: area- equivalent diameter

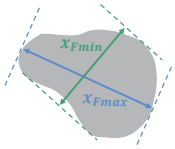


$$Irregularity = \frac{D_{imax}}{D_{cmin}}$$

A: projected area of the particle



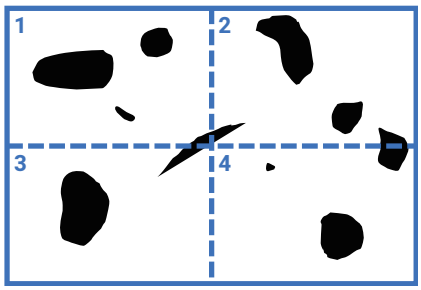
$$Circularity = \frac{x_A}{x_P}$$



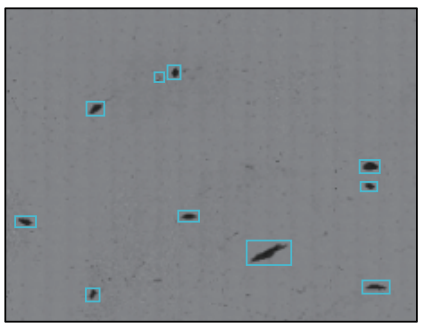
x_{Fmax} , x_{Fmin}:
maximum and minimum Feret diameters

Panoramic Mode

The panoramic mode is to stitch separate images into a full view that records all particles in a millimeter-level region and keeps their shape details.
With a panoramic image, it is easy to measure the total number of particles or defects, and to locate and classify them based on size and shape parameters.

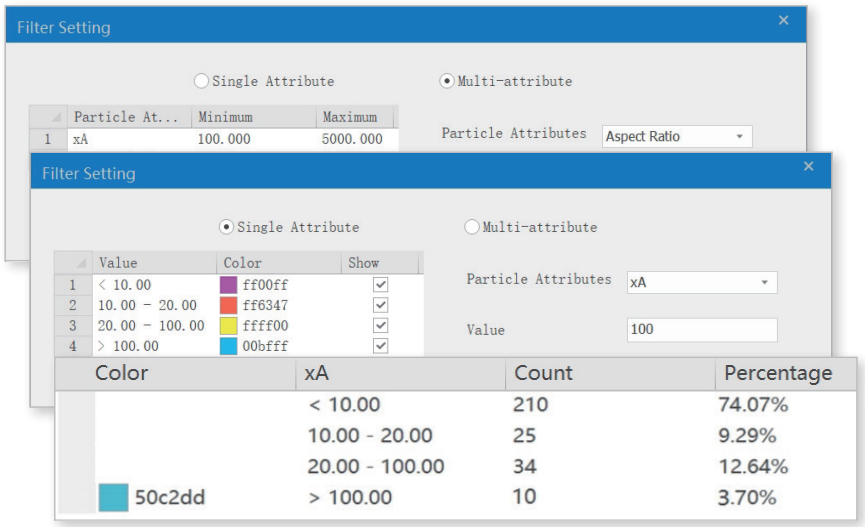


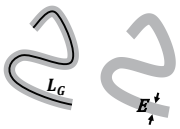
A combination of macro vision with micro details



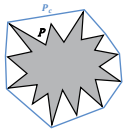
Features and benefits

- Automatic focus adjustment throughout scanning guarantees high-quality images and accurate results.
- Conditional filter based on size and characteristics helps particle count and classification.
- Rescanning in a higher magnification helps in-depth analysis.





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



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

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

Shape parameters

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

Round-likeness and rectangle-likeness:
circularity（11 optional algorithms）
irregularity
compactness
extent
box ratio

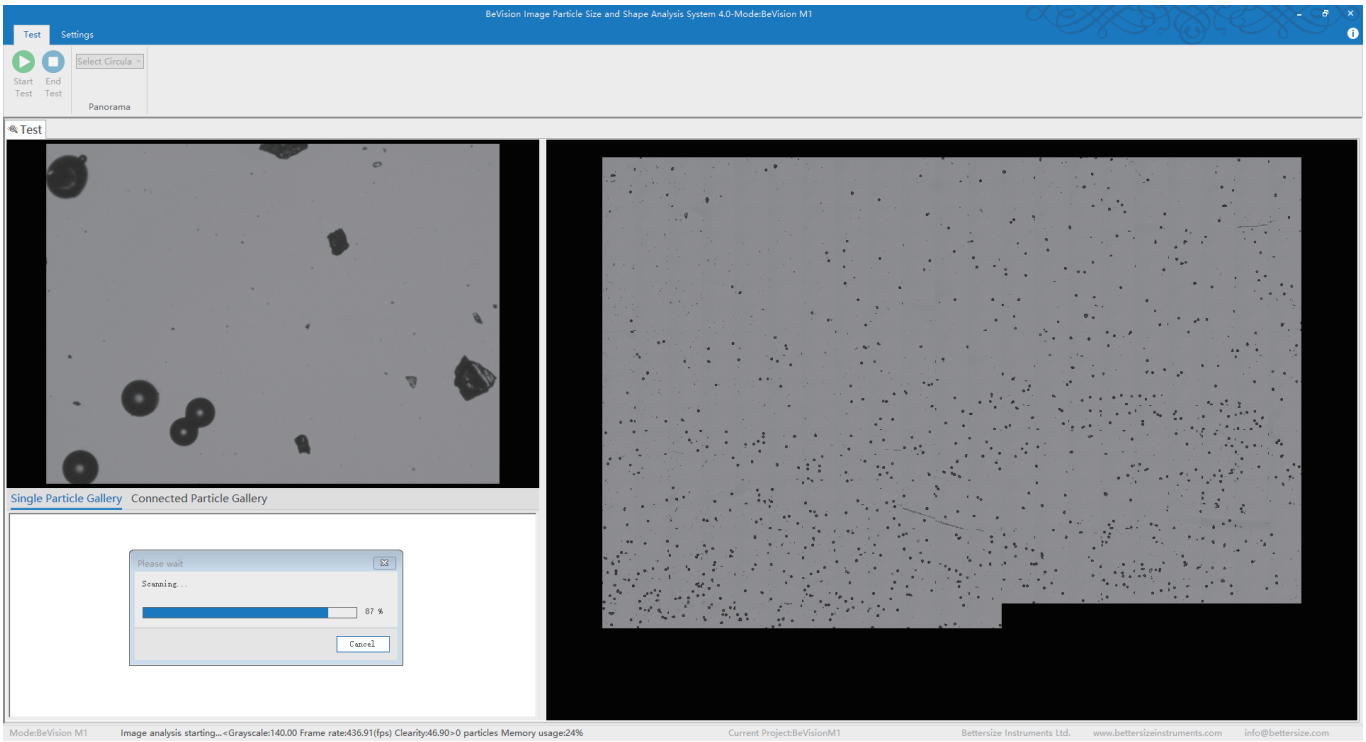
Contour concavity:
concavity
convexity
solidity

For elongated particles:
elongation
straightness

BeVision Software: Visualized Insights for You

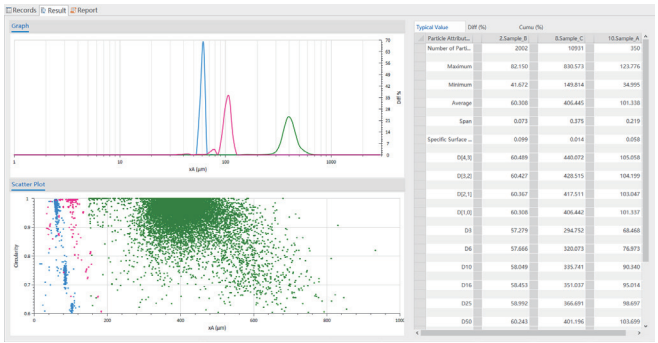
Automatic scan

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



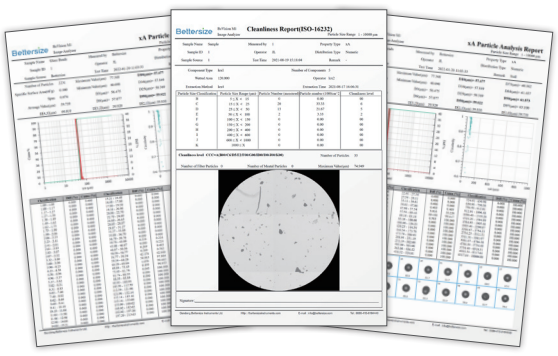
Comparable results

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.



Report editor

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

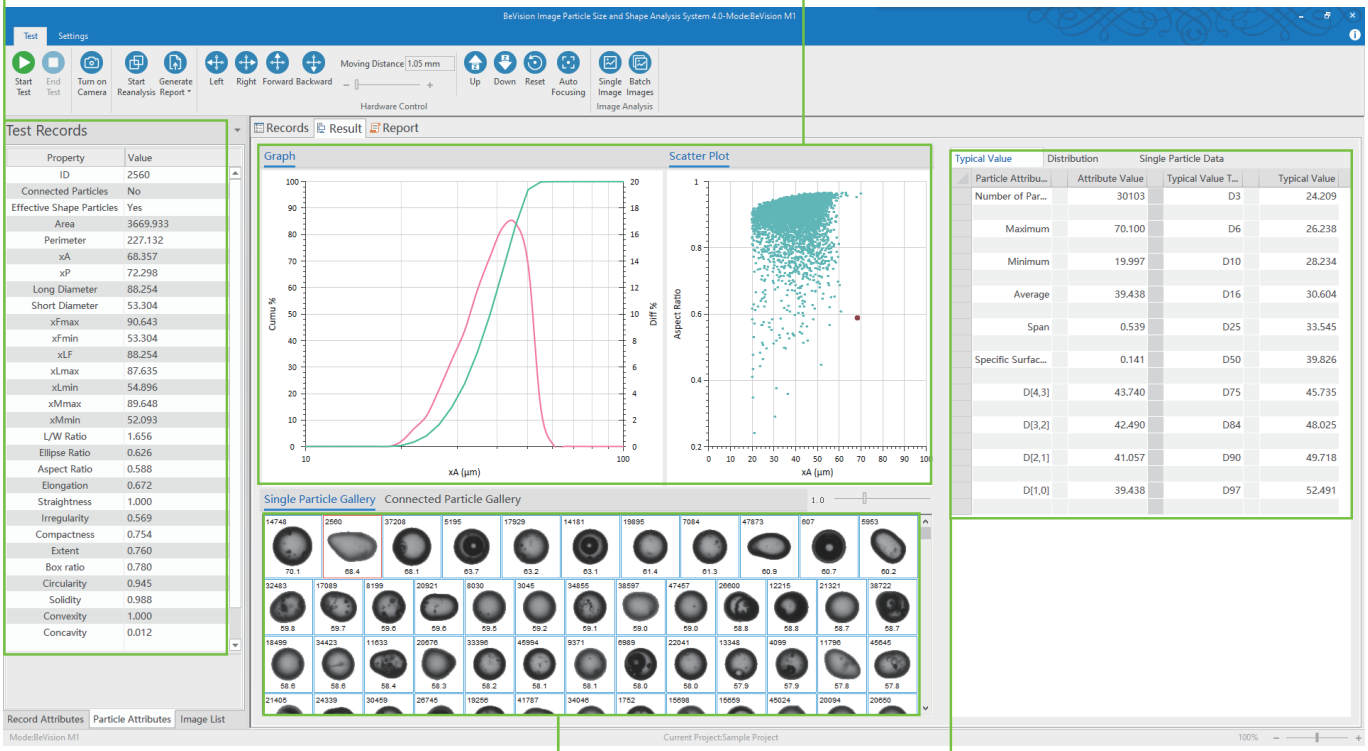


Particle details

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.

Distribution in total

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



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.

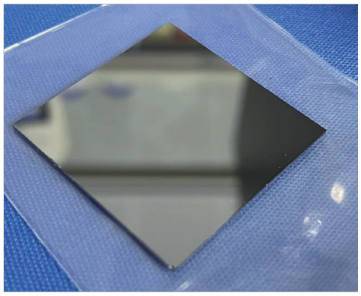
Distribution in summary

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. The typical value chart is customizable.

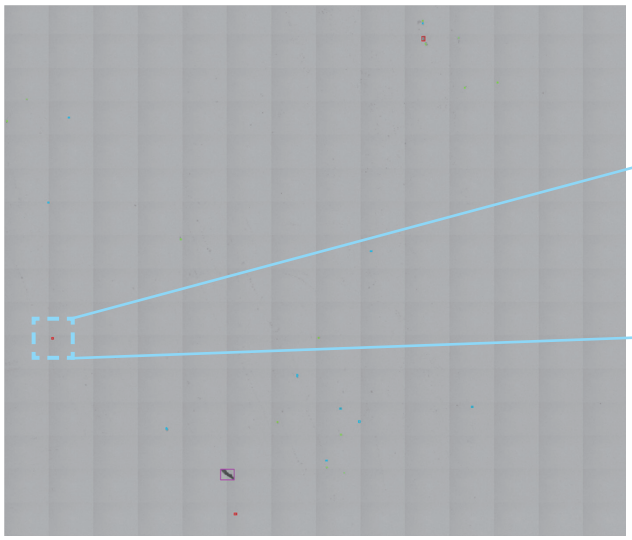
Application Cases

Silicon substrate cleanliness inspection

Large-area scanning quickly obtains a full view of the surface. Small-area rescanning with a higher magnification performs local in-depth analysis.

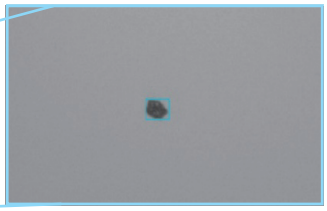


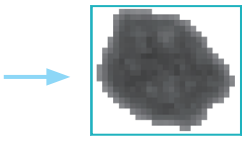
Large-area scanning



Color	xA(μm)	Count	Percentage
7cfc00	< 10.00	37	63.79%
fe00fe	10.00 - 20.00	17	29.31%
ffff00	20.00 - 50.00	3	5.17%
ff4500	> 50.00	1	1.72%

Magnified local rescanning



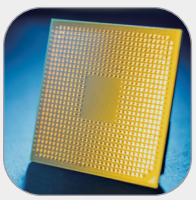


Area	240.171
Perimeter	21.230
xA	17.487
xP	19.490
Long Diameter	19.731
Short Diameter	16.048
xFmax	21.142
xFmin	15.883
xLF	19.964
xLmax	19.821
xLmin	17.360
xMmax	20.799
xMmin	15.807

L/W Ratio	1.230
Ellipse Ratio	0.876
Aspect Ratio	0.751
Elongation	0.961
Straightness	1.000
Irregularity	0.770
Compactness	0.827
Extent	0.715
Box ratio	0.757
Circularity	0.897
Solidity	0.952
Convexity	0.992
Concavity	0.048

Typical Applications

Surface Cleanliness



Abrasives

Paints, Inks & Coatings

Metal Powders

Agriculture

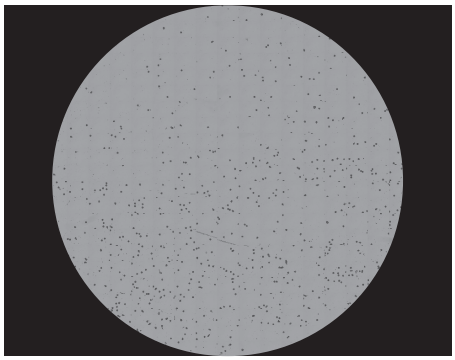
Mining and Minerals

Automotive

Ceramics

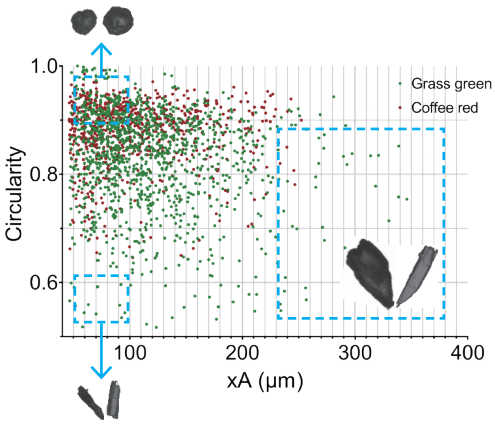
Coolant tube cleanliness measurement

Surface cleanliness is a key factor for machinery manufacturing, the automotive industry, etc. As clarified in the ISO-16232 standard, an important step of coolant tube cleanliness measurement is to measure the size distribution of particles trapped on membrane filters. Also, the types of pollutants need to be identified, such as metals or microfibers. The BeVision M1 can do necessary inspection and analysis automatically, such as counting the particle number, identifying microfibers, and the cleanliness classification.



Mineral pigments

The mineral pigment is a type of pigment derived from ground ore. The size and shape of mineral pigment particles affect the quality and performance of paint products. The BeVision M1 offers high-resolution size and shape measurement results at good efficiency, helping the QC engineers achieve an insightful validation of mineral pigments. A scatter plot showing the relationship between particle size and circularity helps compare the shape distribution of samples A and B, and guides designing paint recipes.



BT - 910 Helps to Prepare Dry Powders

How does it help?

The BT - 910 dry powder disperser 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, automatically scanning
Parameters	Particle size, shape, size and shape distribution, particle count, cleanliness
Measurement performance	
Measuring range	0.3 – 10,000 μm
Typical measurement time	3 to 10 min *
Scanning range	55 × 55 mm
Functions	Scanning mode, panoramic mode, single image analysis, batch images analysis
Main device	
Microscope	Metallographic microscope
Light source	Reflective light (Halogen lamp) , transmitted light (Köhler illumination)
Optical lens	4 ×, 5 × BD, 10 × BD, 10 x 20 × (with 40 × digital magnification) **
Camera	CMOS, 12Mpix, up to 120FPS
System parameters	
Dimensions (L × W × H)	35.0 × 65.0 × 67.0 cm
Weight	18.7 kg
Supply voltage	100 / 240 V, 50 / 60 Hz
Software	
Conformity	ISO 13321, ISO 9276, ISO 16232, ISO 4406
Reports	Report editor
Computer	
Computer system	Windows 10 system or Windows 11 system, 64 bits
CPU	Inter Core i5 – 8400 or above
Memory	16GB or higher
Hard drive	SSD, 500 GB or higher
Ports of host	At least 1 ethernet port, and 1 USB 3.0 port
Screen resolution	1920 × 1080 or higher
* Scanning area and lens magnification used dependent.	** More optional lens available.
BT – 910 dry powder disperser	
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

30TH ANNIVERSARY
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BOUNDARIES
SHAPING
THE FUTURE

RIFERIMENTO PER L'ITALIA

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Visit Our BeVision M1 Site

Visit Our Official Youtube Channel

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