

BeVision D2

A Precise Vision of Particles



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“The BeVision D2 is easy to use and quickly provides high-resolution results that are key to the quality assurance of our product line.”

PetroChina Company Limited Petrochemical Research Institute

The BeVision D2 provides an efficient solution to the size and shape analysis of dry, high-flowability powders or granules. Tens of thousands of particles can be measured by a BeVision D2 within three minutes.

Combining a high-speed camera with a precise telecentric lens, the BeVision D2 is able to efficiently analyze the size and shape of particles in the range of 3.5 - 13,000 µm.

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.

Measuring 10, 000 particles within

3 minutes*

**Sample and sample preparation dependent*

A

high-speed camera

captures free - falling particles

Real-time

results during measurements

Features and Benefits

- Measurement range: **3.5 – 13,000 µm**
- **34** different particle size and shape parameters
- **Reduction** of workload and time
- Outstanding **reproducibility**
- Fully **automated** operation
- Results in compliance with **ISO 9276-6**
- **Powerful software** provides a comprehensive evaluation
- **Comparable** with sieving results

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.



Efficiency

A continuous particle flow passing through the measurement zone helps achieve a higher efficiency of the measurement.

Oversized particle sensitivity

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

Reliable results

The maximized number of measured particles ensures the statistical significance of measurement results.

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.

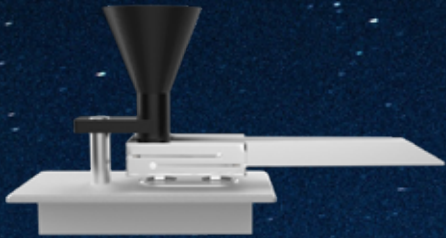
	Static Image Analysis		Dynamic Image Analysis
	BeVision S1	BeVision M1	BeVision D2
Measurement range	0.3 - 4,500 µm	0.3 - 10,000 µm	3.5 - 13,000 µm
Particle shape analysis	●●●	●●●	●●●
High-resolution for narrow distributions	●●●	●●●	●●●
Accuracy for broad distributions	●	●●	●●●
Reproducibility	●	●●	●●●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

BeVision D2 Hardware:

Guaranteed Accuracy and Efficiency for You

To measure the size and shape of particles over a great variety of applications, the BeVision D2 has equipped with a comprehensive range of hardware. Corresponding to the sample material properties, selecting the best hardware can help measure the size and shape of particles with optimum accuracy and efficiency.

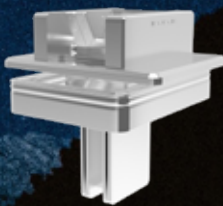
Feeding chutes and funnels



To help particles flow appropriately during the test process, the BeVision D2 prepares several customization options for feeding chutes and the feeding funnel.

The customizable coating material for the funnel and chute can effectively prevent particles from sticking to the wall. The funnel size and the chute size are also customizable based on requirements, permitting the BeVision D2 to hold an appropriate volume of samples.

Adjustable feeding guides



The feeding guide is used to orient the particle flow in the focusing range of the objective lens, thus the quality of captured images and accuracy of measurements are ensured.

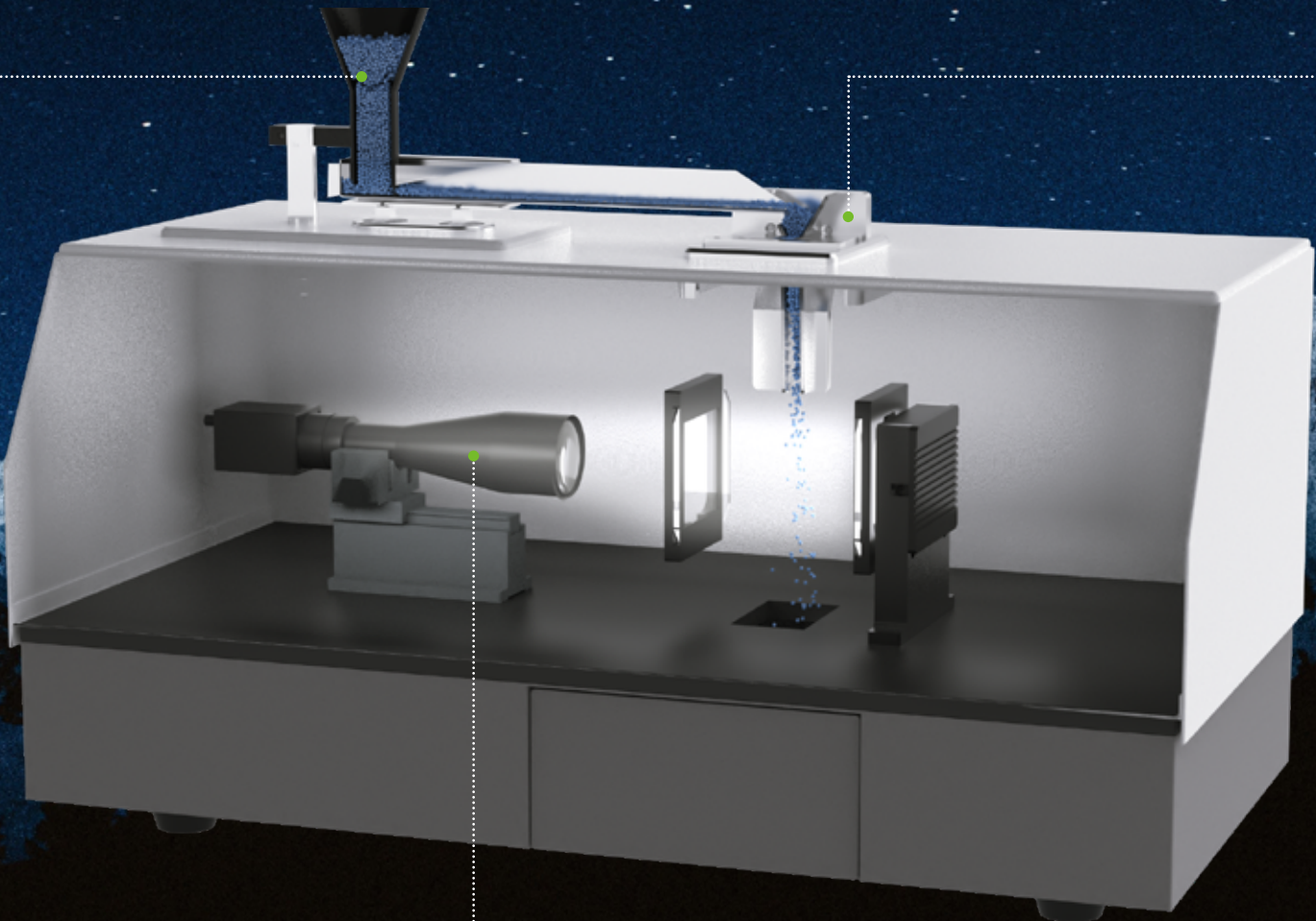
Based on the approximate particle size, the width of feeding guide openings can be adjusted to achieve a balance between the feeding rate and the quality of images.

Objective lens



Depending on the approximate particle size and the width of the particle size distribution, the BeVision D2 offers 5 optional objective lenses to ensure measurement accuracy.

Each optical lens has its own efficient working range, to accurately measure particle size and shape of a great variety of samples. According to ISO 13322, it is recommended to select a working range covering the whole size distribution range of the sample.



Lens options	1 μ m	10 μ m	100 μ m	1,000 μ m	10,000 μ m
2x lens	3.5	11	32	589	883
1x lens	7	21	63	1700	1766
0.5x lens	13.8	41	124	2355	2533
0.3x lens	23	69	207	3925	5888
0.132x lens	52.2	157	470	8921	13000

able to detect particles size is complaint with ISO both size and shape are compliant with ISO

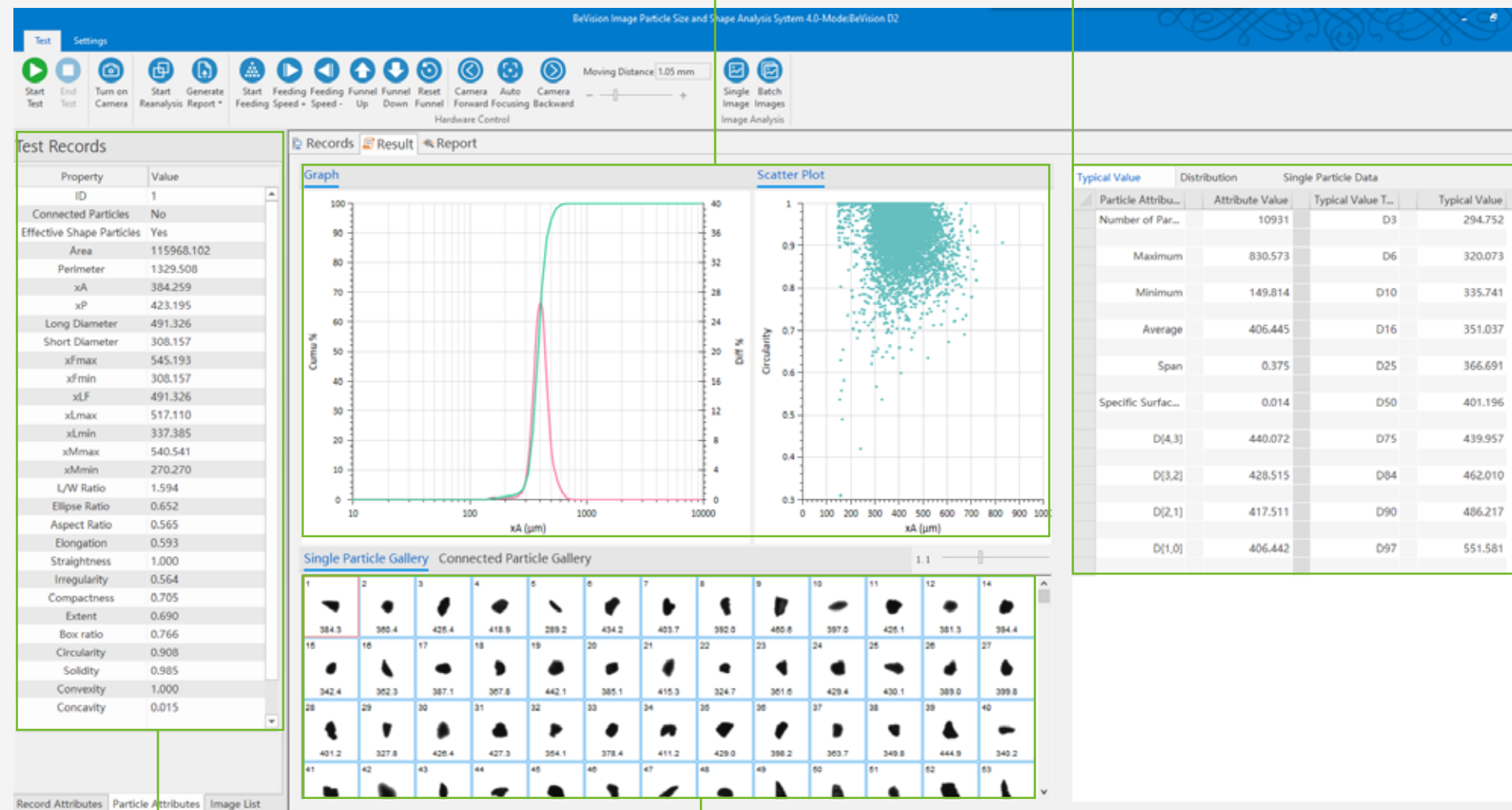
BeVision Software : Visualized Insights for You

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, D90. The typical value chart is customizable.



Particle details

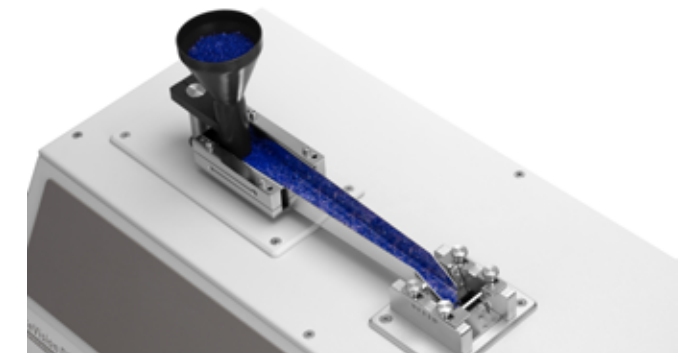
For irregularly shaped particles, it is hard to describe their size with a single dimension. Scanning over 180 different directions of each particle projection, the BeVision software is able to precisely analyze particles, and present the particle size and shape in 34 different parameters. The size and 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.

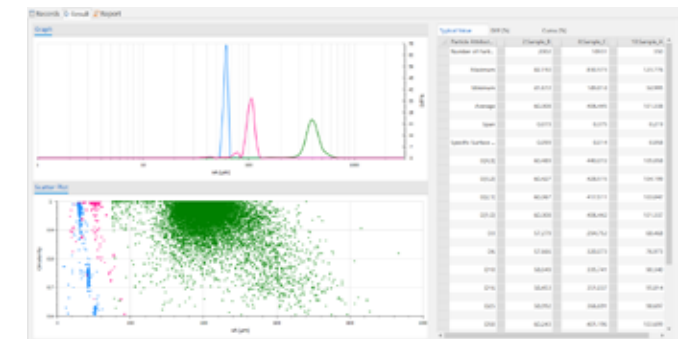
Reproducible measurements

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



Comparable results

The record comparison function makes it possible to do a comparison among multiple records: particle size or shape distribution comparison, typical value comparison, etc.



Reports keep flexible

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



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

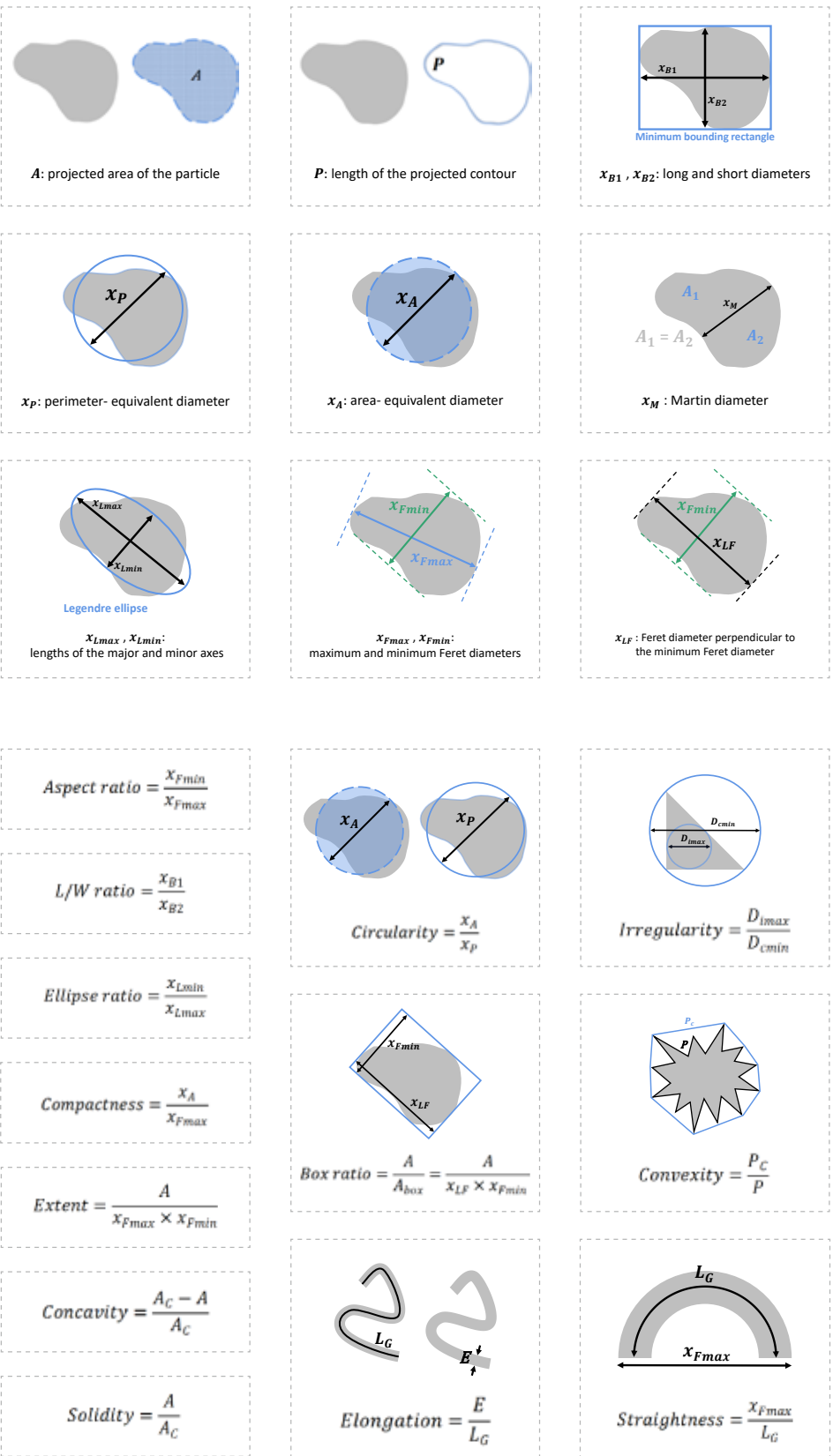
Shape parameters

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



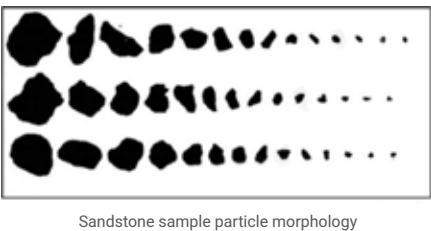
Typical Applications



Application Cases

Natural sands

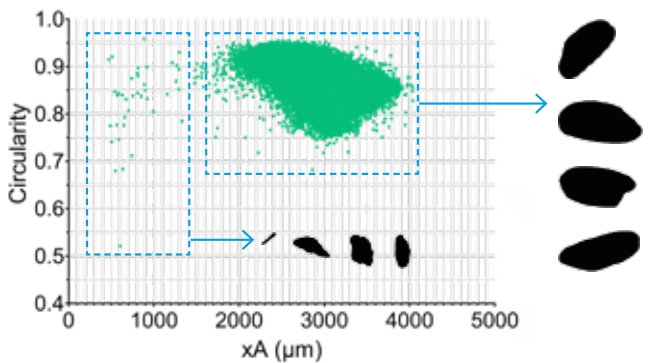
Researchers of a variety of industries, e.g., the oil and gas industry, place great importance on the morphological information of soils and sediments. The natural sands challenge image analyzers from 2 aspects: the size and shape of natural sands are distributed in a wide range and the efficiency of the shaping process. The BeVision D2 gets over these challenges with its wide measuring range and excellent efficiency and helps a research team of the China University of Petroleum successfully measure the size and shape of natural beach sand samples.



Adapted from Yan, Y., Zhang, L., Luo, X., Li, C., Hu, F., A new method for calculating the primary porosity of unconsolidated sands based on packing texture: Application to modern beach sand, *Mar. Pet. Geol.*, 2018, (98), 384-396.

Grains

The size and shape of cereal particles, especially refined grains, affect the quality and value of the final product. To help monitor the size and shape of cereals, the BeVision D2 offers high-resolution measurement results at good efficiency. The scatter plot showing the relationship between particle size (x_A) and aspect ratio, helps QC engineers handle the size-shape distribution of the rice kernel sample and measure the content of broken rice and impurities.



General	
Measuring principle	Dynamic image analysis method
Parameters	Particle size, shape, and number
Measurement performance	
Measuring range	3.5 – 13,000 µm
Typical measurement time	1 to 3 min *
Number of size / shape classes	100 (user adjustable)
Special functions	SOP settings, automatic tests, analysis of saved images
Main device	
High-speed CMOS camera	Up to 120 images per second
Light source	White LED stroboscopic parallel light source
System parameters	
Dimensions (L × W × H)	61.0 × 35.0 × 44.0 cm
Weight	26 kg
Supply voltage	100 / 240 V, 50 / 60 Hz
Software	
Conformity	ISO 13322, ISO 9276
Reports	Customizable reporting

* Sample and sample preparation dependent

Bettersize
BETTER PARTICLE SIZE SOLUTIONS

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