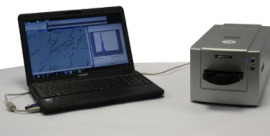




PowderShape

Measuring the geometry of particles

The powerful PowderShape systems allows you to correctly measure size parameters and shape descriptors according to ISO 9276-6 as well as color and transparency both in dry and in liquid suspended form. Our quality inspection systems try to leverage the potential inherent in image analysis while trying to keep the tedious details of using image analysis away from the end user as much as possible. The systems focus on:

- simplicity in sample preparation,
- simplicity in testing the sample
- reproducibility of the results at any time
- managing and tracking the material's quality

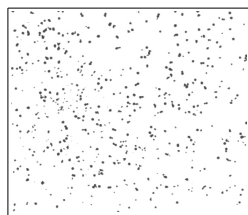
<p>► PowderShape M (PowderShape software package, computer and a medium format scanner)</p>	<p>► PowderShape FA (PowderShape software package, computer and a flatbed scanner with an automatic sample feeder)</p> <p>► PowderShape FA Aqua (for liquid sample preparation)</p>	<p>► PowderShape FH (PowderShape software package, computer and a flatbed scanner with a hand operated sample feeder)</p>
 <p>3200 dpi, large contact area with high optical resolution</p>	 <p>1600 dpi real optical resolution</p>	 <p>1600 dpi real optical resolution</p>

The PowderShape software is available as QC (quality control) or PRO (quality control, resarch and development) version.

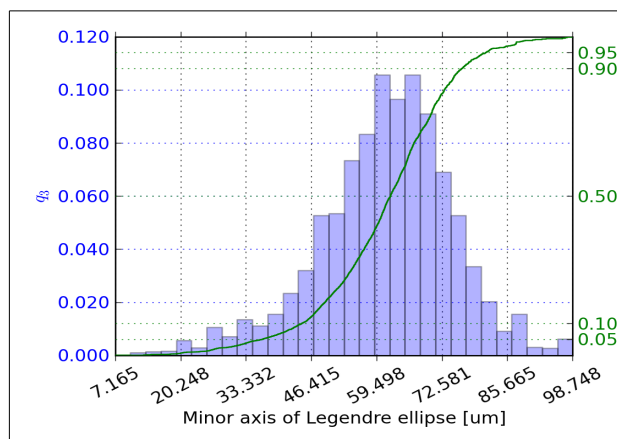
Size and shape measurement of WOKA powder with PowderShape M



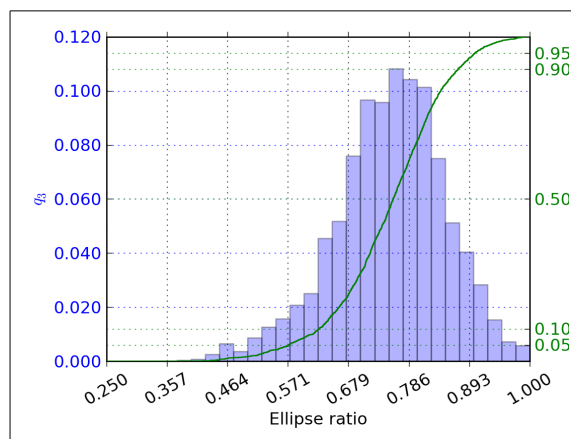
WOKA (30 - 50 μm)



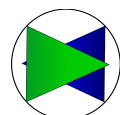
← 3,5 mm →



Histogram of size measurement



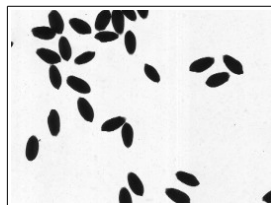
Histogram of shape measurement



WOKA powder is typically used for thermal spraying and is in use for the wear protection of surfaces. To ensure the quality of the micro-meter size powders the size- and shape distribution are measured with PowderShape M.

If the true geometrical dimensions of smaller particles needs to be measured, the medium format scanner can be combined with high-resolution digital microscopes.

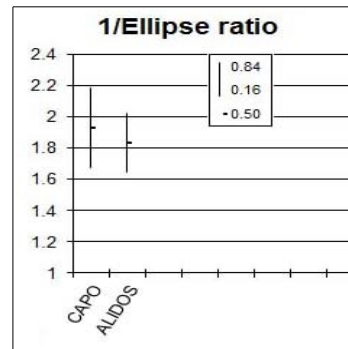
Size and shape measurement of two types of wheat grains with PowderShape FA



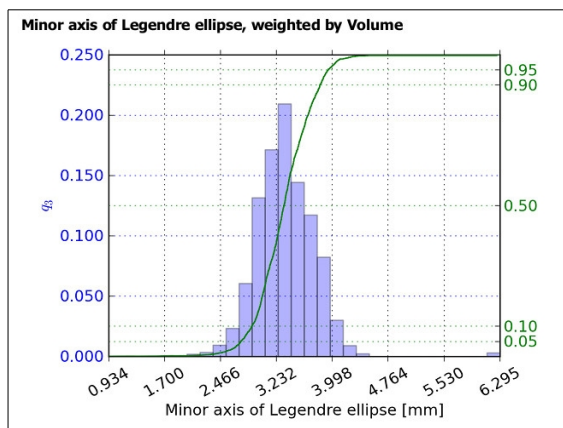
Scanned wheat grains
(type: Capo)



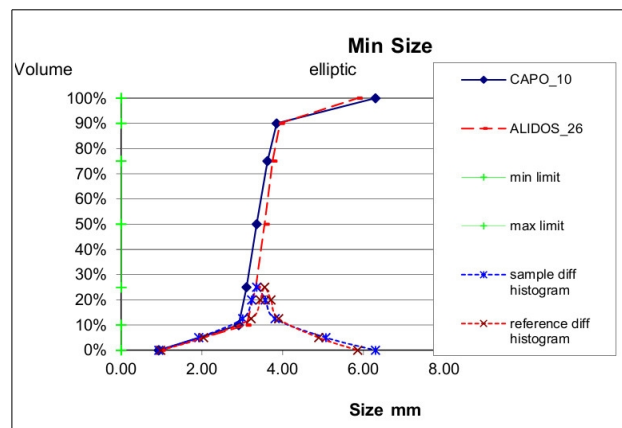
Scanned wheat grains
(type: Alidos)



Comparison of ellipse ratio
parameter



Min size measurement of wheat grains type Capo



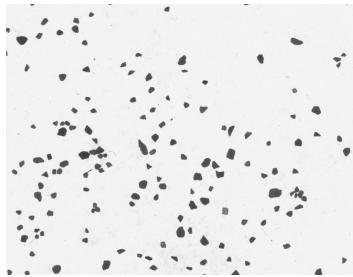
Comparison of Min Size of wheat grains type Capo and type Alidos

The characterization of grain, grits, particles, or powders with PowderShape FA allows to control the quality of the incoming material and to monitor the quality of the grains during processing and of the final product.

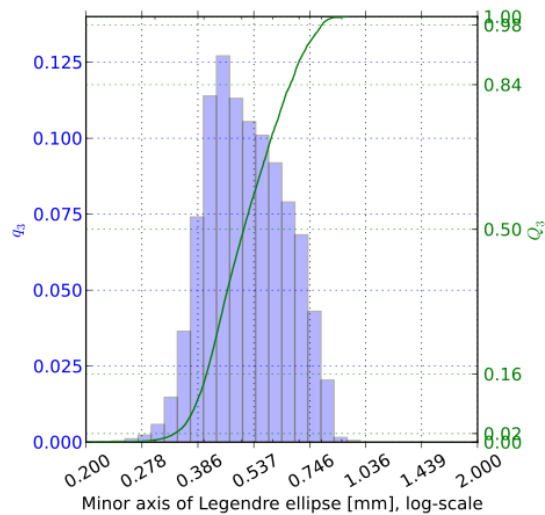
The following analysis can be done with food grains:

- Grain size analysis
- Shape analysis (e.g. aspect ratio, ellipse ratio, elongation, circularity, convexity)

Shape measurement of aggregates for cement with PowderShape FH



Aggregates for cement



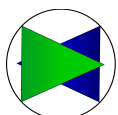
The histogram shows the width distribution (minor axis of Legendre ellipse) of the particles weighted by volume.

$q_3(x)$ = distribution density by volume and $Q_3(x)$ = cumulative distribution by volume.

Statistics:

	Median	Span ¹
Minor axis of Legendre ellipse:	0.44 mm	0.25 mm
Solidity:	0.9166 mm	0.0440 mm
Circularity c:	0.8836 mm	0.0740 mm
Aspect ratio:	0.7391 mm	0.2614 mm

¹ Span = $X_{90,r} - X_{10,r}$



Specifications:

Recommended size range:	
PowderShape M:	Medium format scanner: 20 µm to 5 mm in grain size
PowderShape FA:	Flatbed automatic scanner: 30 µm to 3 cm in grain size
PowderShape FH:	Flatbed hand scanner: 30 µm to 3 cm in grain size
Microscopes (that can be combined with PowderShape):	<ul style="list-style-type: none"> • digital microscope: 2,5 - 100 µm • confocal laser scan microscope : 0,2 - 2 µm • scanning electron microscope: 20 nm - 1 µm • transmission electron microscope: 1 nm - 200 nm
Characterization parameters:	<ul style="list-style-type: none"> • particle size (grain/grit size, max size, min size) • shape descriptors according to ISO 9276 - 6 such as aspect ratio, ellipse ratio, elongation, circularity, convexity • optical properties: color and transparency
Typical application:	Granules, metal powders, pharmaceutical powders, sand, aggregates, food grains, abrasive grits, seeds, pollen, etc.
Report features:	<ul style="list-style-type: none"> • size or shape parameters weighted by length, area or volume • diagrams: histogram and/or cumulative distribution logarithmic and linear scale • statistical quantities: mean, median, standard deviation, span
ISO Compliance:	ISO 9276 - 6
Voltage:	220/110 V 50/60 Hz;
Software PowderShape PRO:	<ul style="list-style-type: none"> • freely adjustable size ranges, shape and color filters • allocation of each recognized particle to the parameter values • calibration of the scanner • creation of individual user profiles • creation of individual measure masks • interactive reporting system available in English and German

