

U.S. SALES AND TECHNICAL SUPPORT  
QAQC LAB WHITE STONE VA 22578 TEL (804) 318-3686



You want precision, you need morphology



**OCCHIO 500nanoP**  
Pharmaceutical powders analysis



**QAQC LAB**

**[www.qclabequipment.com](http://www.qclabequipment.com)**

Imaging solutions in particle analysis



## ❖ By a team focused on powder characterisation

Through the efforts of an international and multidisciplinary team of engineers, **OCCHIO** offers you a complete range of solutions, starting from 200 nanometers and ranging up to centimeters.

Whether it is for laboratory instrumentation, «at line» or even «on line» solutions, **OCCHIO** is prepared to be your partner in high-level powder characterization. **OCCHIO** and **OCCHIO 500nanoP** bring you accuracy, profit and innovation.

### \_ Accuracy

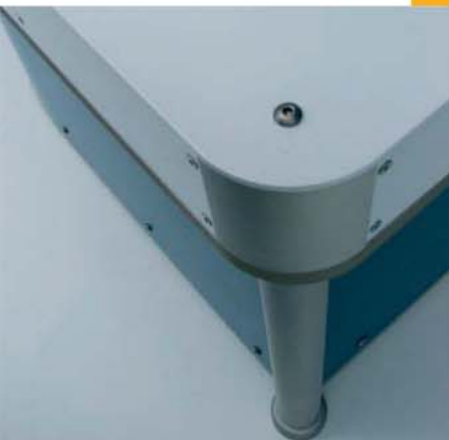
With its proprietary Blue Collimated Light and high quality telecentric lens, **OCCHIO 500nanoP** will change your own perception of image analysis, measuring particles which are invisible

### \_ Profit

**OCCHIO 500nanoP** is a fully automatic device dedicated to powder quality characterization. It is easy to use and carries out rapid analyses in less than 2 minutes. **OCCHIO 500nanoP** is able to accurately measure very small samples, below 1 milligram of pharmaceutical powders.

### \_ Innovation

Morphology measurement is more than shape description. To improve, you need robust and significant measurement. Based on decades of university research, the **OCCHIO 500nanoP** provides your R&D department with dedicated parameters, specially engineered for your industrial purposes.



# OCCHIO 500nanoP

The best solution for measuring powders



## ❖ From samples to reports, your solution is ready for use

### OCCHIO Pharma

More than a microscope, the system combines an integrated vacuum dispersion device, monochromatic collimated back-light for ideal contrast, telecentric lens for unrivalled image quality, new fast auto-focus, magnification calibration before each analysis and advanced software for size and morphometric analysis.

OCCHIO 500nanoP provides you with high quality images with a resolution of less than 400 nanometers. The entire system is engineered to remove diffraction so that a clear and



## ❖ Be the best at every step of the measurement process

### Image acquisition

- Use the best high-resolution camera on the market; 6.6 Mega Pixels.
- Eliminate diffraction with monochromatic Blue backlighting illumination.
- Increase the quality of the particle's outlines with collimated light and telecentric lens.
- Be perfectly focused on each particle thanks to an innovative light-lens combination.
- Use the entire range of pixel values to obtain a perfect threshold.
- Avoid vibration problems due to the high-speed camera.
- Reduce maintenance costs and increase robustness with a fixed camera and light.







OCCHIO

## INTEGRATED DISPENSER

### ❖ From samples to reports, your solution is ready for use



This **patented** dispenser is placed automatically onto the glass plate allowing fully automated analyses. Without any sample contamination or damage, this Vacuum Dispenser will gently deposit millions of individual grains of powder on a slide glass within a few seconds.



### ❖ Be the best at every step of the measurement process

#### Dispersal

- Maintain the integrity of the powder. There is no impact. The Vacuum Dispenser uses the vacuum strength to gently dissociate agglomerates.
- Good orientation of each individual particle with natural sedimentation on the sample glass.
- Avoid contamination with the dispersion done directly onto the glass plate already placed on the analysis instrument.
- Eliminate artifacts with perfectly cleaned sample glass.



The best solution for measuring powders

## SIZE AND SHAPE



### ❖ Size and morphometric measurements

#### \_ Size

The **Inner Diameter** (also known as Sieve Diameter) is the maximum inscribed disc within a particle, known as, is computed with a true Euclidean Distance Transform. The fast and accurate algorithm developed is exclusive to **OCCHIO**, providing for computing real size distributions.

The **Area Diameter** is the diameter of the equivalent area circle.

The **Mean Diameter** is the mean of all radii joining the centre of mass and the outline's pixels.

**Area** and **Volume** are also computed on the particle projected area.

#### \_ Shape

Inertia **Elongation** measurement is computed from one minus the ratio between inertial ellipse axes.

**Feret Bounding Box** is the bounding box parallel to the Inertia Ellipsoid.

**Width** and **Length** are computed directly on this Feret Bounding Box.

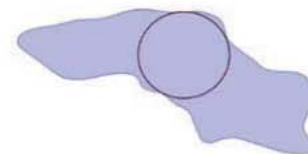
**Max Distance** is the maximum distance found within the particle.

**Convexity** is defined as one minus the ratio between convex area and particle area. The convex area is built with a virtual rubber band fitted on each particle.

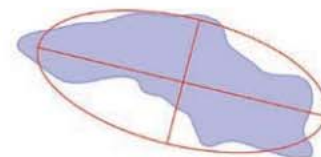
**Reactivity** (also known as Circularity) is defined as the ratio between the equivalent area circle perimeter divided by the actual particle perimeter.

**Shape factor** is computed with the formula  $SF = P^2/A$  where P is the **Perimeter** and A the Area.

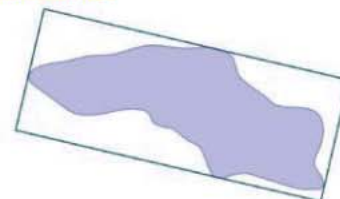
Inner Diameter



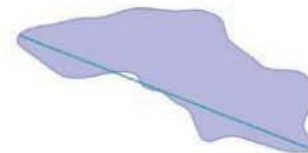
Elongation



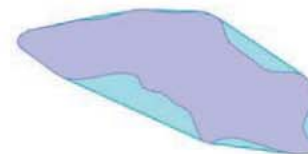
Width - Length



Max Distance



Convexity





OCCHIO

## OCCHIO PHARMA SOFTWARE

### ❖ From samples to reports, your solution is ready for use

#### OCCHIO 500nanoP

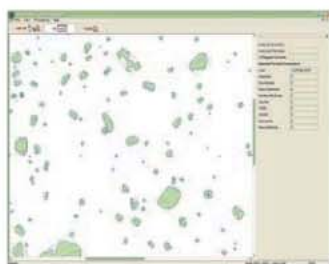
**Callisto Pharma Software** is 21 CFR part 11 compliant, ensuring accurate powder characterization. Complete automated procedure including powder dispersion, analysis and report generation. All the analysis steps follow the customer defined standard operating procedure (SOP) in order to guarantee repeatability between operators.



### ❖ Achieve the best results at every step of the measurement process

#### Measure

- Standard Operating Procedure groups software and analysis variables in a protected file in such way that Supervisors can define for each powder type a suitable Set Of Parameters. Operators can then run defined SOPs with a single click.
- Automatic calibration of the device before each analysis optimizes accuracy and allows changing the magnification depending on the sample to be analyzed.
- Auto-focus is operational continuously during the analysis.
- Use the best in image analysis, employing accurate and robust parameters based on the latest developments in mathematical morphology.
- Enhance security with software security based upon Windows operator level.





The best solution for measuring powders

CALLISTO SOFTWARE



## ❖ From samples to reports, your solution is ready for use

### Callisto

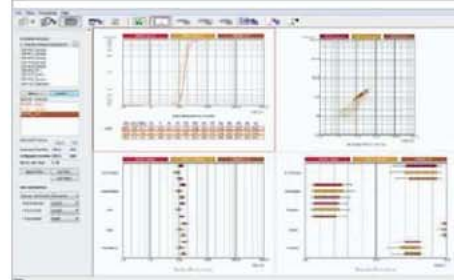
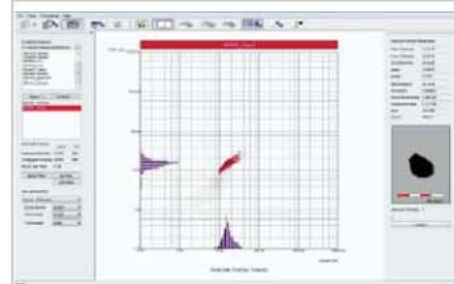
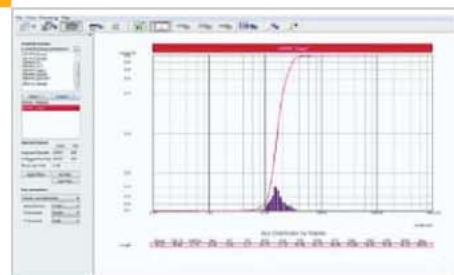
Just as **OCCHIO 500nanoP** could become part of your process, **Callisto**, and its dedicated statistical software package, can make unlimited sample comparison, real time statistics, interactive plots and customizable reports available to everyone on your network, no matter where they are located.



## ❖ Achieve the best results at every step of the measurement process

### Result presentation

- Compare unlimited number of measurements.
- Share complete results with colleagues or clients who are connected to your network.
- Understand your product perfectly with individual ID CARD and photographs of every grain.
- Summarize measured parameters of hundred-thousands of particles with a mouse click.
- Visualize your products in innovative morphological space.
- Print the report you have designed to fulfill your quality policy requirements.





# OCCHIO 500nanoP SPECIFICATIONS

- Particle range : from 0.4  $\mu\text{m}$  up to 2000  $\mu\text{m}$ .
- Representative measurements in less than 2 minutes.
- Number of particles analyzed defined by the user (from one to millions).
- Storage and computing of individual particle characteristics.
- Real-time storage of full resolution particle outlines.
- Parameters : Sieve Diameter, Equivalent Diameter, Mean Diameter, Volume, Area, Width, Length, Elongation, Convexity, Hole Detection, Perimeter.

## OCCHIOPHARMA TECHNICAL SPECIFICATIONS

Dimensions	80 x 50 x 81 cm or 31.5 x 19.7 x 31.9 inches
Total weight	50 kg or 110 lbs
Power	110-240 V 50/60 Hz
Operating Environment	Temperature 5°C - 45°C Humidity 35% - 80% non-condensing



## IMAGING DEVICE

CMOS integrating active pixel sensor
Pixel Pitch 3.5 x 3.5 microns.
6.6 Mega Pixel - digital output
Telecentric lens
Collimated Blue back-lighting



## COMPUTER (included inside 500nanoP)

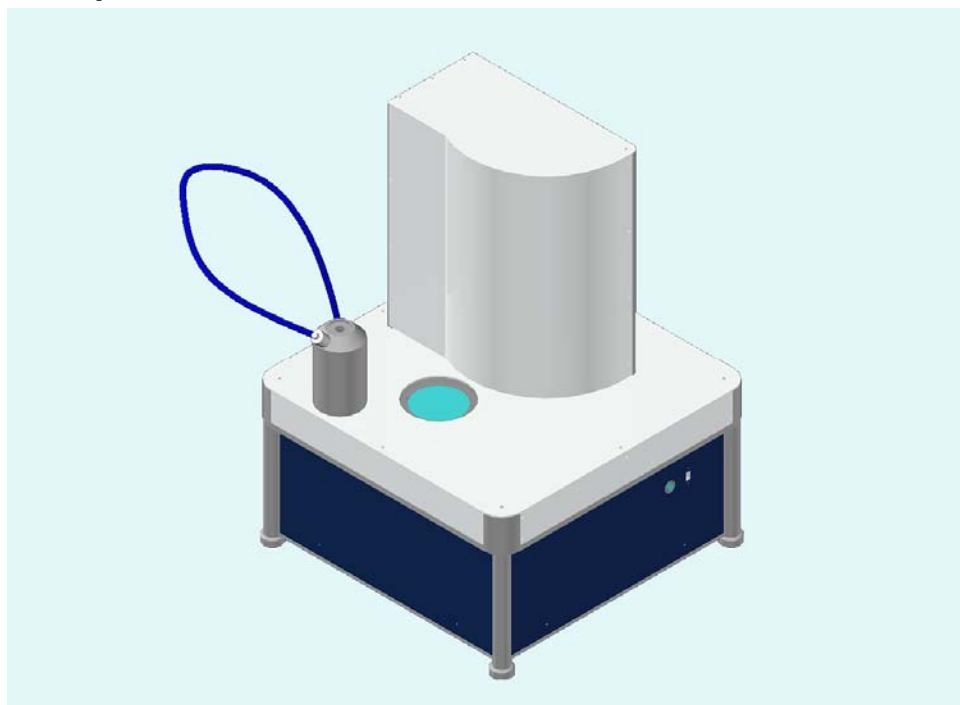
Windows 7 operating system
PC Core 2 Duo 3 GHz, 2Gb-800MHz RAM, 160 Gb SATA HDD, Ethernet
Ergonomic Flat Panel Display
Mouse and keyboard

\*Specifications subject to change without notice.



Reference code: OCC023 Occhio500nano

**Technical specifications**



**Particle size range (0.4 microns – 2000 microns)**

Dimensions and weight

	Description
Length	540 mm – 21.2 in
Width	540 mm – 21.2 in
Base height	300 mm – 11.2 in
Include tower (total height)	720 mm – 28.3 in
Weight	38.5 Kg – 84.9 lbs
Connection	3 USB II at 480Mbps, Ethernet, VGA

Working condition

	Description
Working temperature	5-40 °C non condensing
Power Supply	100-220 Vac 50-60Hz






Integrated computer (minimum specification)

	Description
Processor	Intel Core i5-650 @3.2GHz, 4MB cache
Ram	4 GB @ 1156MHz
Hard Disk	500MB
Display	LCD, FullHD, 21.5"
Mouse, keyboard	USB (English)
Operating system	Windows seven compatible XP or Vista or

Optics and imaging device

	Description
Standard camera type	C-mos progressive scan
Camera resolution	6.6 Millions pixels (2200 x 3000 pixels)
Pixel size	3.5 $\mu\text{m}$ side
Lens type	Telecentric variable magnification zoom
Lens resolution	From 0.38 to 4.7 $\mu\text{m}/\text{pixel}$
Field of view	836 x 1140 $\mu\text{m}$ @0.38 $\mu\text{m}/\text{pixel}$ 10266 x 14000 $\mu\text{m}$ @4.7 $\mu\text{m}/\text{pixel}$
Light source	Collimated monochromatic light
Light wavelength	440 nm
Calibration slide	Calibration slide is integrated in the instrument
Light output diameter	25 mm

**Starting kit parts (these parts are included in the packing box at the delivery)**

Part number	Description	Quantity
OCC011SW 	CALLISTO EXPERT	1
023-058-R1 	Particles are dispersed on 96mm diameter glass plate	5
023-060-R1 	Vacuum sample dispersion chamber (Aluminium) Diameter 84mm Height 140mm Sample introduction hole diameter 16mm	1
023-500-R1 	Stop valve include tube and fast coupling	1
023-501-R1	Vacuum sample dispersion chamber sealer ring	1
023-502-R1 	Sample holder, plastic cups for dispersion unit	10
023-503-R1	Plastic membrane foil, 50 $\mu\text{m}$ thickness	1
999-0003-R1 or 999-0004-R1	Power supply cable North America or Power supply cable Europe	3
999-0007-R1	LCD, FullHD, 21.5"	1
999-0008-R1	Mouse	
999-0011-R1 or 999-0010-R1	USB Keyboard(English) or USB Keyboard(FR)	1

023-100-R1	Spatulas kit (2mm ; 3mm ; 4mm ; 6mm)	1
999-1001-R1	Standard 10µm Dry borosilicate glass beads 10µm nominal diameter, for instrument calibration	1 g



**HR Option**

Option code – 023-HR	Description
High resolution camera type	C-mos progressive scan
Camera resolution	10 Million pixels (3840 x 2748 pixels)
Pixel size	1.67 $\mu\text{m}$ side
Lens resolution	From 0.19 to 1.11 $\mu\text{m}/\text{pixel}$
Field of view	730 x 522 $\mu\text{m}$ @0.19 $\mu\text{m}/\text{pixel}$ 4262 x 3050 $\mu\text{m}$ @1.11 $\mu\text{m}/\text{pixel}$

**Occhio 500nano short instrument overview**

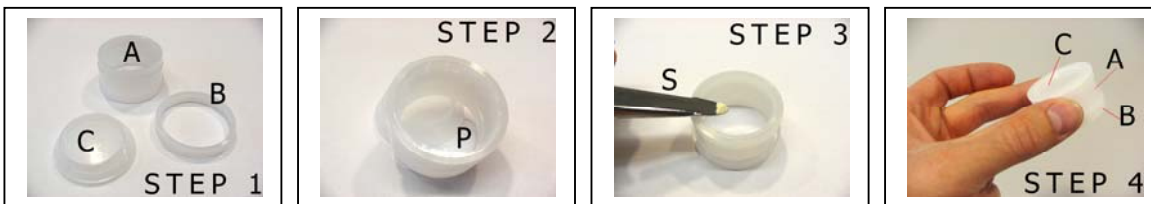
**Instrument calibration**

Occhio 500nano includes a calibration slide. A calibration procedure is available on the Standard Operating Procedure. Light, background and size calibration could be done in few second before each analysis. For an advanced calibration procedure, using standards glass beads, a ‘calibration table’ could be charged by the software automatically before each analysis.

**Dry powder preparation and dispersion**

Sample preparation

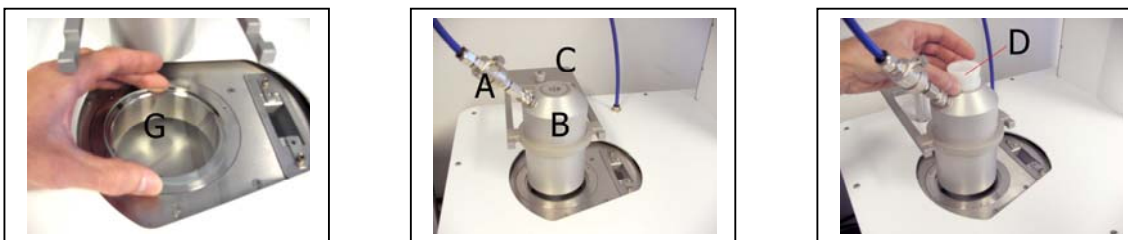
One or more samples can be prepared and sealed in small caps. After four simple steps and in just a few seconds, your samples are ready for the analysis



- A: Plastic cup
- B: sealer ring
- C: Plastic cover
- P: Plastic membrane
- S: Sample

Sample dispersion

Place the glass on the plate, mount the disperser on its holder, place the sample cup on the dispersion chamber and run your S.O.P.



- G: Glass plate
- A: Vacuum check valve

B: Vacuum chamber  
 C: Vacuum chamber holder  
 D: sample cup

Model	500nano
Sample support	Monolayer dispersion on a round plate
Plate diameter	96mm
Sample particles size range	From 400 nm to 2 mm* *max object size
Sample dispersion	By vacuum on round glass support
Sample analysis	Size distribution cumulate and proportional curve Number distribution or volume weighted distribution
Standard Operating Procedure includes	Glass plate clean check Optical (size) calibration Light intensity calibration Auto focus Vacuum dispersion Particles counting Creation of a particle database Image storage Filtering procedure Automatic reporting generation

### **Software mains features**

Model	Callisto Software for 500nano
Size parameters (Iso 9276-6; 7; 8) All the size parameters are displayable or not according with the customer setting preference	ISO Area diameter ISO Inner diameter Mean diameter Perimeter diameter Crofton diameter Half Crofton diameter Width Length Ellipse Width Ellipse Length ISO Max Distance ISO Geodesic Length
Shape parameters (Iso 9276-6; 7; 8) All the shape parameters are displayable or not according with the customer setting preference	Occhio Bluntness Occhio Roughness Elongation ISO Aspect Ratio Ellipsoid Elongation Ellipsoid Roundness Ellipse Ratio ISO Eccentricity ISO Straightness ISO Roundness ISO Compactness

	<p>ISO Extent          ISO Solidity          Convexity          ISO Circularity          Luminance mean          Luminance var.          Porosity</p>
Advanced shape parameters	Developed in function of customer specifications
Image format	Bitmap
Data storage	<p>' .oph' binary Occhio files format contains:          Full size distribution values          Shape and size percentiles          Outline and greyscale levels of each particle</p>
Data comparisons	Open and compare more analysis on the same plots include 'trends graphic'
Plots and figure (By number or volume weighted values)	<p>Acquisition info (short overview of the used SOP)          Size distribution          Size percentiles          Shape percentiles          Shape distribution          Mean shape by size          2D scatter-plot (fully selectable particles map)          3D scatter-plot (include animation)          Percentiles sample images          Sample images (BMP exportable format)          Id card for each particle (BMP exportable format)</p>
Statistics tools	Morphological and size filtering procedure
Reporting and data export	<p>Raw data export (text format)          Table distribution export (text format)          Table distribution and percentile export (Excel format)          Automatic or custom reporting          Full image export (bmp format)          Single particle image export (bmp format)          Figure and graph export (bmp format)</p>
Microscope mode pane	Use the device in manual mode select glass positioning, grab and store images, look at the particles in real time and display the values of each particles in the live image

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