

YOKOGAWA 



FlowCam[®] Nano

FLOW IMAGING MICROSCOPY

Next-generation submicron particle imaging

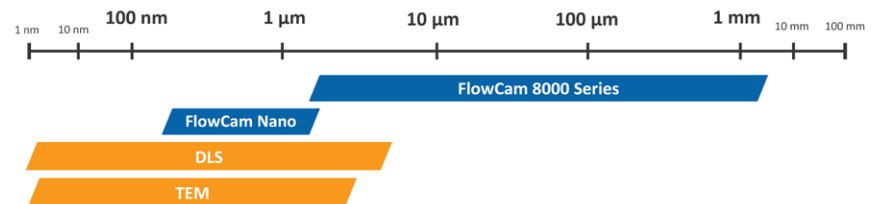
Particle Analysis with Vision®

FlowCam Nano bridges the gap between traditional flow imaging microscopy and other analytical techniques in the nanometer size range. Flow Imaging Microscopy is used to determine particle size, concentration, and shape in biotherapeutic research and development, bioprocess monitoring, and materials characterization.

Obtain submicron particle information that enables early detection of API aggregation, other degradation products, and impurities in protein therapeutics, cell and gene therapies, and nano drug delivery systems.

FlowCam Nano provides the highest-resolution images of submicron particles using a patented oil-immersion, flow imaging technology paired with our industry-leading image analysis software VisualSpreadsheet®.

- Image and analyze particles ranging in size from 300 nm to 2 μm
- Use morphological data to identify the structure and nature of contaminants and improve product development
- Obtain relative quantifications of intrinsic, extrinsic, and inherent particles in parenteral drugs



GAIN INSIGHT

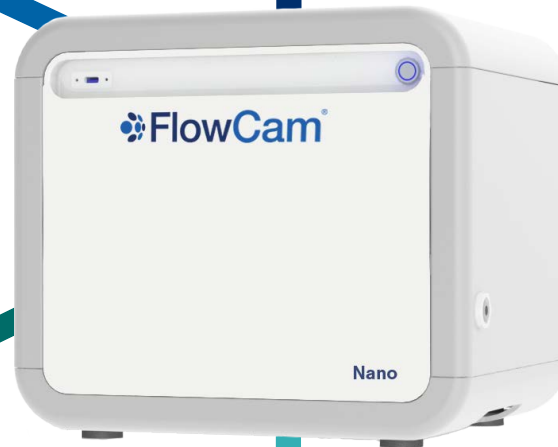
Acquire high-resolution images to detect and identify submicron particle types to inform product development and monitor product quality.

EXTEND SIZE RANGE CAPABILITIES

Obtain size, morphology, and relative concentrations of particles that are too small to be detected by traditional Flow Imaging Microscopy.

DETECT AGGREGATES EARLY

Preemptively detect and mitigate protein, viral vector, and drug delivery vehicle aggregation that can lead to larger, more problematic subvisible and visible particles.



MAINTAIN SAMPLE INTEGRITY

Analyze samples in their native environment. FlowCam Nano accommodates particles suspended in aqueous fluids and buffers.

OBTAIN MEANINGFUL RESULTS

Obtain statistically significant results in less than a minute, with as little as 50 μ L of sample. With advanced hardware and processing capabilities, FlowCam Nano is streamlined for rapid data acquisition and analysis.

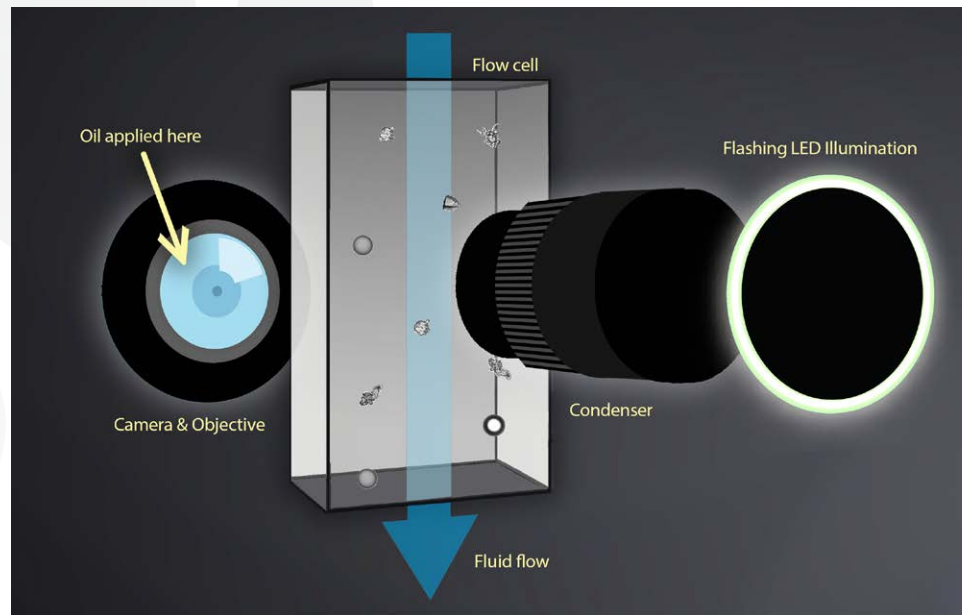
BE FLEXIBLE

Use FlowCam Nano in both research and routine operations and work with a wide range of particle types.

How it Works

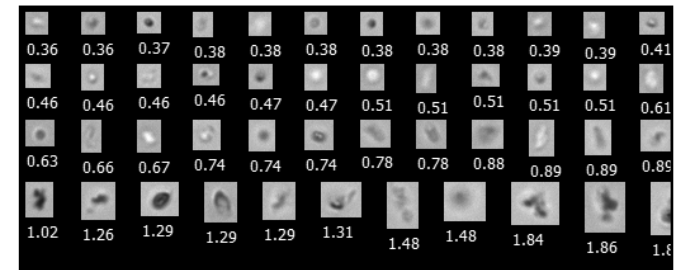
FlowCam Nano employs a patented modification of flow imaging microscopy that uses an oil immersion-based light microscopy system to capture images with 40X magnification. This allows the instrument to detect particles between 300 nm and 2 μm – the smallest objects visible with light microscopy.

- 1 A sample is manually loaded into the injection port
- 2 A high-precision syringe draws the sample into an optical flow cell and a fluidics sensor initiates data acquisition
- 3 A high-speed camera records images of the full width and depth of the flow cell as the sample flows through the optical field of view
- 4 Particle images are segmented from the camera images and captured in real-time as they flow through the flow cell
- 5 Data may be further analyzed, grouped, and filtered post-acquisition

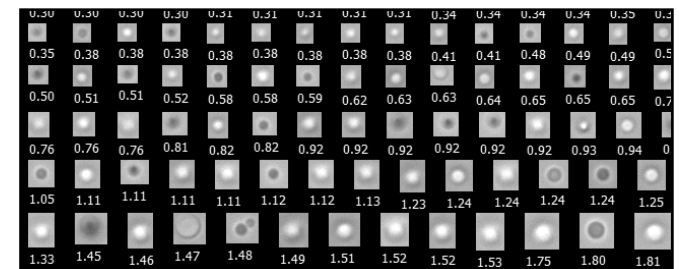


FlowCam Nano Applications

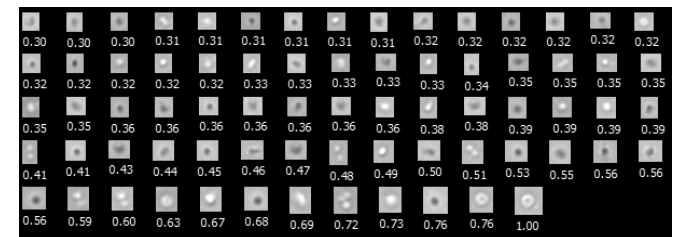
- **Protein formulation research and development**
Monitor your formulation for protein aggregates, intrinsic particles including silicone oil, degraded polysorbate, and glass flakes, as well as extrinsic contaminants.
- **Early detection of aggregates**
Detect forms of API aggregation and degradation preemptively.
Proactively improve drug product stability before subvisible and visible API degradation particles are present.
- **Gene therapy aggregate monitoring**
Identify aggregation of nanomedicine delivery vehicles, including oligomers of larger vehicles like LNPs, viral vectors, and exosomes.
- **Materials Characterization**
Assess manufacturing processes like filtration to ensure product quality in downstream processing steps.
- **Bacterial Contamination**
Determine if common bacteria morphologies (i.g. rods, groups of spheres) are present in a sample to rapidly identify contamination.



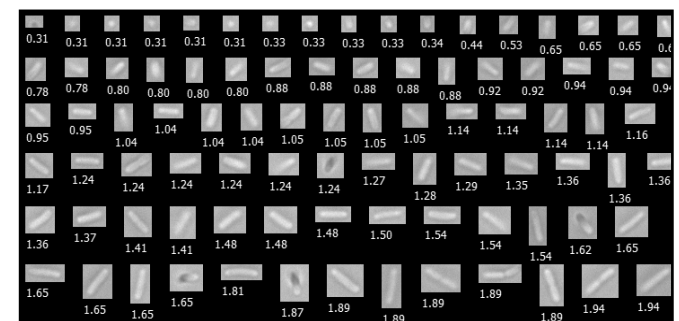
Protein aggregates



Silicone oil droplets



Lipid nanoparticle aggregates



E. coli

VisualSpreadsheet Software

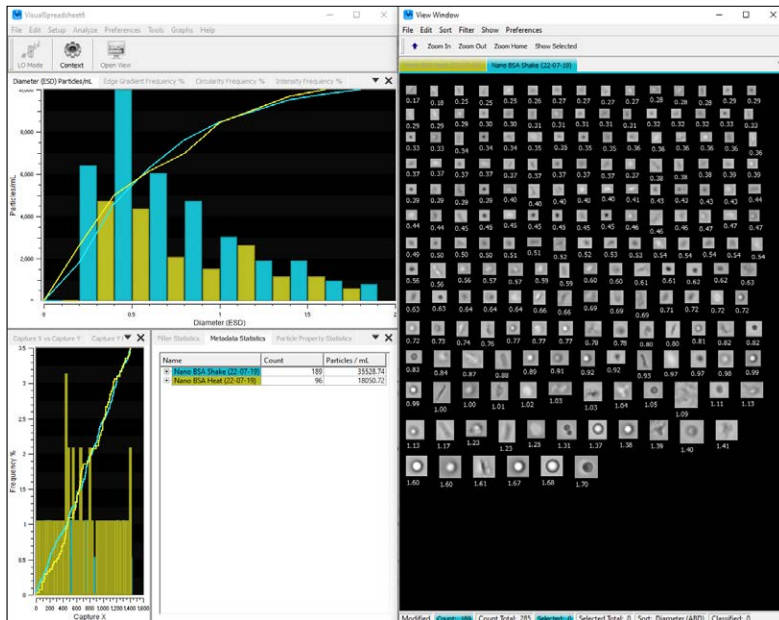


Turning Data into Insight

VisualSpreadsheet is a powerful, all-in-one software program capable of setting up methods, acquiring data, and processing images captured with FlowCam.

Analyze, sort, filter, group, and classify images based on 40+ morphology parameters and their combinations, or use the “Find Similar” function in the software to identify what is in your sample. Group data from multiple runs or samples for easy comparison.

VisualSpreadsheet offers an optional 21 CFR Part 11 compliance package.



World-Class Customer Service

Our customer service team is available to help with all things FlowCam, including:



- Technical Support
- Remote and On-Site Training
- Application Support
- IQ/OQ Services
- Preventative Maintenance
- Repairs and Upgrades

Maximize your FlowCam utilization with a full training package led by our experts – customized for your application. This hands-on, in-depth training provides a thorough understanding of flow imaging microscopy. Learn from our scientists how to run and analyze samples; and get a wealth of tips and tricks to get the most out of your instrument.

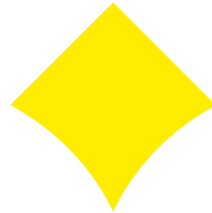
Every new instrument includes a one-year warranty, unlimited email and phone support, and one year of free access to FlowCam University training.

For continuous support we offer Gold or Silver service plans that include annual preventative maintenance services, software upgrades, access to virtual training, personalized remote support, and other benefits.

Specifications

PARTICLE SIZE RANGE	300 nm to 2 μ m
MAGNIFICATION & FLOW CELLS	40X magnification with 60 μ m flow cell
MINIMUM SAMPLE VOLUME	50 μ L
SAMPLE PROCESSING CAPABILITY	25 μ L/minute
FLUIDICS	Micro-syringe pump with 250 μ L syringe
DATA ACQUISITION METHOD	Flow imaging microscopy with oil immersion
CAMERA	High resolution (1440 x 1080 pixels) CMOS sensor, monochrome
FRAME RATE	Shutter speed up to 130 frames per second
FOCUS METHOD	Automatic
MEASURED PARAMETERS	<p>Basic Shape Parameters: Area, Aspect Ratio (width/length), Diameter (Spherical and Area-Based), Length, Volume (ABD-based), Volume (ESD-based), Width, 3 Biovolume Measurements</p> <p>Advanced Morphology Parameters: Area (Filled), Circle Fit, Circularity, Circularity (Hu), Compactness, Convex Perimeter, Convexity, Elongation, Fiber Curl, Fiber Straightness, Geodesic Aspect Ratio, Geodesic Length, Geodesic Thickness, Perimeter, Roughness, Symmetry</p> <p>Grayscale Measurements: Edge Gradient, Intensity, Sigma Intensity, Sum Intensity, Transparency</p>
SOFTWARE OPTIONS	21 CFR Part 11 compliance module
DIMENSIONS & WEIGHT	44 cm wide x 36 cm deep x 39 cm tall, 23 kg (45 kg shipping weight)
POWER REQUIREMENTS	100-240 VAC / 50 or 60 Hz, 92 watt maximum

Specifications are subject to change without notice



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Yokogawa Fluid Imaging Technologies

Yokogawa Fluid Imaging Technologies manufactures industry-leading particle analysis instrumentation based on digital imaging technology. Our flagship product, FlowCam, is the first automated particle analysis instrument to use digital imaging for measuring size and shape of microscopic particles in a fluid medium. FlowCam has been deployed in over 50 countries, supporting research, development, and environmental monitoring in the life sciences, materials research, and industrial applications.



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