FLUID IMAGING TECHNOLOGIES

Particle Analysis with Vision©

# FlowCAM®: A Digital Imaging Particle Analyzer for Measurement and Characterization of Particulate Matter

Most particle analyzers only give you a "count" of particles and a single measurement, "diameter". Usually referred to as "Equivalent Spherical Diameter", or ESD, this measurement is based upon measuring something proportional to volume, and then deriving "diameter" by assuming that volume is contained in a spherical shape. While this may be useful for calculating a "particle size distribution", it certainly does not tell the whole story, as shown in Figure 1.

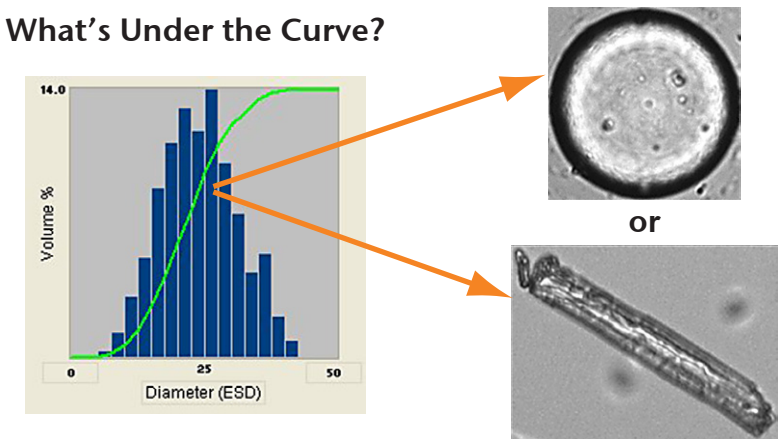


**Figure 1: Volumetric-based particle analysis systems can not distinguish between 2 similar sized particles with very different shapes**

FlowCAM® is an imaging-based particle analyzer that takes a digital image of each particle, and records up to 26 different measurements (size, shape *and* spectral) for each particle simultaneously. Using the included VisualSpreadsheet© software, the particles can then be sorted and filtered based upon these measurements just as one would do in a spreadsheet, except that the results are displayed visually in the form of images alongside the tabular results. Powerful statistical pattern recognition algorithms can be employed to *automatically* separate different particle types found in a heterogeneous sample.

## FlowCAM Features:

- Measures particle size, count/concentration *and* shape (up to 26 different measurements available)
- Wide particle size range capable (2µm to 2mm)
- Black & white *or* color image of each particle stored
- Real-time software filtering and sorting of particle images using VisualSpreadsheet
- Powerful, automatic statistical pattern recognition for particle classification
- Optional cross-polarized illumination
- Optional scatter-trigger and fluorescence measurements
- Benchtop and Portable configurations available

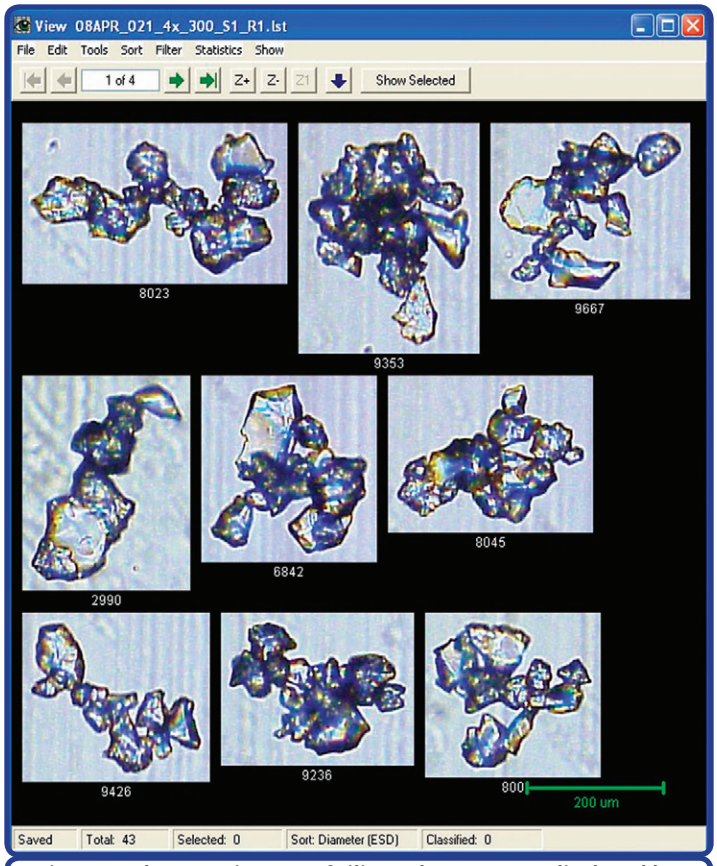


**Figure 2: FlowCAM images of silica gel aggregates displayed by selecting "upper tail" of size distribution histogram.**

FlowCAM® combines the speed of automated particle analysis systems with the ability to distinguish individual particles found in microscopy. Wherever you used to use a microscope, you can now use FlowCAM to acquire, measure and classify up to 50,000 particles/minute, giving you greatly increased statistical confidence in your data. FlowCAM will complement other quantitative particle analysis data with image-based data that lets you actually ***see*** the results for visual verification and interpretation.

As the first to market with this technology, and with over 12 years of continued leadership, Fluid Imaging Technologies, Inc. is the resource to rely on for imaging particle analysis technology. We invite you to take us up on a free FlowCAM sample evaluation: we will run a sample of your material through the instrument and interactively show you the results via the web. You will see the actual images of your sample particles, and be able to see how VisualSpreadsheet© can sort, filter and classify each particle. Many of our prospects have learned something new about their process(es) just from this simple free analysis. We are convinced that once you see the results with your own samples, you will want a FlowCAM in *your* lab!

***Call us today to arrange for a free sample evaluation!***
**(207) 846-6100**
**info@fluidimaging.com**

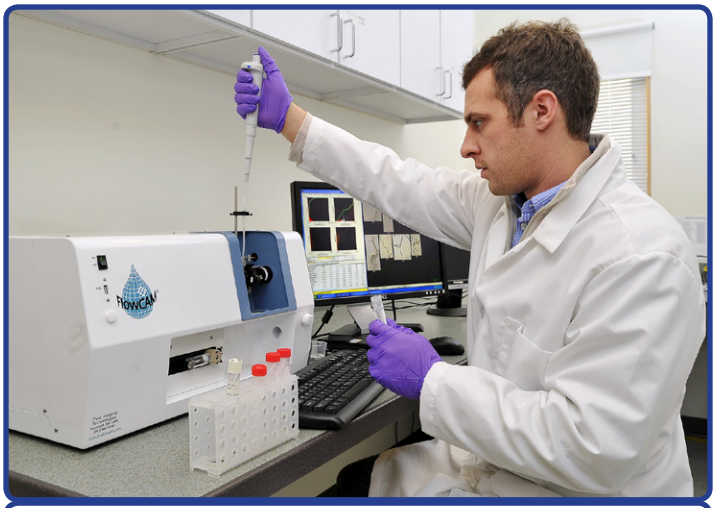

**Figure 3: Benchtop FlowCAM in use analyzing a parenteral drug sample (protein-based therapeutic).**

## Typical FlowCAM Applications:

- **Pharmaceutical: Biologics, API's, Carriers, etc.**
- **Food & Beverage: Ingredients analysis, QA/QC**
- **Chemicals: Raw materials, mix analysis, etc.**
- **Abrasives: Micronized diamonds, CBN, etc.**
- **Chromatography: Column packing material analysis**
- **Other: Microencapsulation, yeast analysis, emulsions, fibers, adhesives, paint & toner, etc.**

## FlowCAM Specifications:

| Parameter | Value (Range) |
|---|---|
| Minimum Particle Size | 1µm (Count) 2µm (Shape) |
| Maximum Particle Size | 50µm (20X), 100µm (10X), 300µm (4X), 2,000µm (2X) |
| Raw Image Field Size | 1280x960 Pixels |
| Gray Scale/Color Resolution | 8 Bits (monochrome), 24 Bits (Color) |
| Image Format | *Uncompressed* TIFF (only particle images saved to reduce data storage requirements by a factor of 100 or better) |
| Basic Shape Measurements | Equivalent Spherical Diameter (ESD), Area Based Diameter (ABD), length, width, aspect ratio, area, volume |
| Advanced Morphology Measurements | Circularity, Elongation, Compactness, Circle Fit, Perimeter, Convex Perimeter, Edge Gradient |
| Gray-Scale and Color (optional) Measurements | Intensity, Average Intensity, Sigma Intensity,Transparency, Average Red, Green, Blue, R/G Ratio, R/B Ratio, G/B Ratio |
| System Options | Cross-Polarized Illumination, Laser-Scatter Triggering, Fluorescence Triggering and Measurement |
| Fluidics | Micro Syringe Pump (standard), Precision Peristaltic Pump (optional) |
| Minimum Fluid Requirements | 50µl, 10 particles/ml, (Syringe pump precision of ±0.001ml) |

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