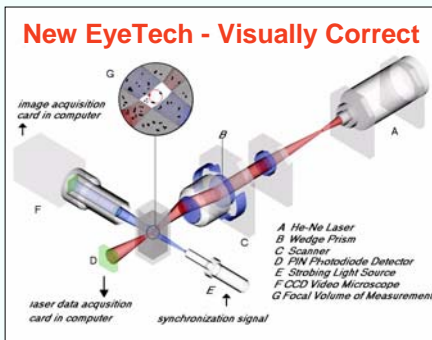




## EyeTech Laser Obscuration

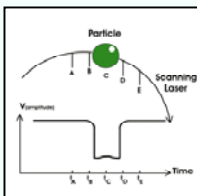
**Time method:** A He-Ne laser (A) is focused down to a 1.2 μm spot by a rotating wedge prism (B). The focus spot circularly scans individual particles. The resulting obscuration signals are detected by a photodiode (D). The duration (pulse width) of each obscuration and its respective pulse derivative **directly determine particle size.**



## EyeTech Dynamic Image Analysis

uses a high resolution (640x480 pixel) CCD video camera (F) and a synchronized strobe light (E) to send images to a frame grabber card for analysis and real-time display. DIA (random orientation of particles) can **solve mysteries** that PSA, Static Image Analysis and the assumption of sphericity cannot.


**Direct and true single particle size measurements** are calculated using a simple formula  $d = v \cdot t$ , where  $v$  is the scan velocity and  $t$  is the obscuration time. The error-free results are placed in 600 discrete intervals.





## SOP Wizard for easy set-up and measurement.

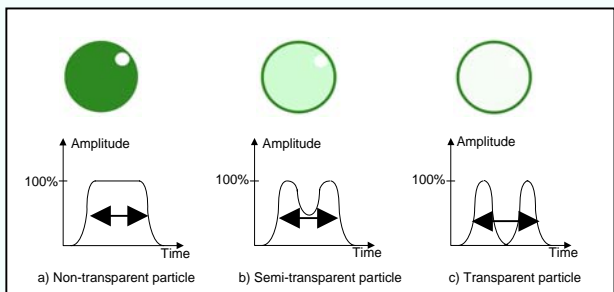
**Advanced Image Analysis Procedures:** Automatic pre-processing (Contrast Enhancement, Threshold and Out-of-focus rejection), 16 Image filters, Region of Interest, Morphology Operations, Grouping by size/shape, etc.

**Over 40 Shape Parameters:** Feret Diameters, Shape Factor, Aspect Ratio, Equivalent diameter, etc; (Re-) processing of stored images, etc.







 Fibers, rods and odd shapes can't be well defined by only one parameter.

 Image Analysis: Size = Average Feret diameter:  $F1 + F2 + F3 + \dots + F36 / 36$ .

 Spherical agglomerate Shape Factor: Left image = 1, Right image = .7



**Resulting Particle Size Distribution is accurate and precise** because only on-center and in-focus scans are used. Off-center and out-of-focus scans are rejected by pulse analysis algorithms.

Shapes	 (Opaque)	 (Transparent)				
Shape Factor	1	<0.1	0.785	0.604	0.436	0.160
Aspect Ratio	1	1	0.707	0.577	0.250	0.100

## Conclusion: the best size, shape & concentration measurement technologies in one unit.

- The measurement relates solely and directly to single particle size. Seeing is Believing!
- For spherical, non-spherical, elongated, agglomeration & particle mixtures, extreme concentrations / volumes.
- Higher accuracy, precision, repeatability and speed; correlation with size, shape, lab and process
- Laser size range: 0.5-3600 μm, lens range: 0.5-600, 2-3600 μm, resolution: 0.33% of full scale (min. 0.2 μm)
- DIA size range: 2-3600 μm, lens range: 2-150, 10-600, 20-3600 μm, pixel min.: 0.7, 2.3, 9.5 μm, respectively
- SOP wizard for easy setup, query and reprocess stored images, automatic reports, automatic alignment test
- Windows XP™, 21 CFR Part 11 compliant, easy to use, change, maintain and validate, small footprint

## Added value: see [www.ParticleSize.com](http://www.ParticleSize.com) for the truth about particle size measurement methods:

EyeTech is not subject to shape dependent measurement errors of [Laser Diffraction](#) (up to 31% for plates and for 70% rods) or to cumbersome conversion of chord length to particle size, as in the [FBRM](#) method.

Moreover, EyeTech technology does not require and therefore is not subject to errors associated with

- the assumption of sphericity, refractive indices of particles and medium
- the assumptions of Mie / Fraunhofer models, multiple diffractions, detector number / location / alignment
- particle optical / physical properties: color, absorption, surface texture, sharp edges, porosity & mixtures
- medium optical / physical properties: viscosity variations, opacity, thermal convection
- randomness of the Brownian motion, orifice clogging, [electrical conductivity](#)



**Particles:** magnetic, delicate, any shape, porous, transparent, translucent, opaque, mixtures, etc.

**Mediums:** dry powder, suspension, aerosol, emulsion, colloid, opaque, corrosive, organic, etc.

**Sample Friendly** Quick Change Modular Measuring Cells and Accessories for most applications:

## WET

### Cuvette

The [ACM-101](#) Magnetic Stirring Cell with **0.5 - 3.5 ml capacity**, in plastic or glass. Concentration: 1,000 to 100,000,000 particles per ml. The [ACM-102](#) has a mechanical stirrer.



### Liquid Flow

The [ACM-104](#) Cell family is available in cross section sizes: 4 x 4 mm and 10 x 10 mm (-104A). The -104L is for **fibers**. See Liquid Flow Controllers below.



### Micro Flow

The [ACM-108](#) is for **opaque dispersions** (ink or emulsions). With signal boost. Cross sections sizes: 4 x 0.5, 4 x 1 or 4 x 2 mm. See Liquid Flow Controllers below.

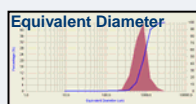
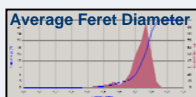
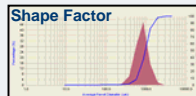
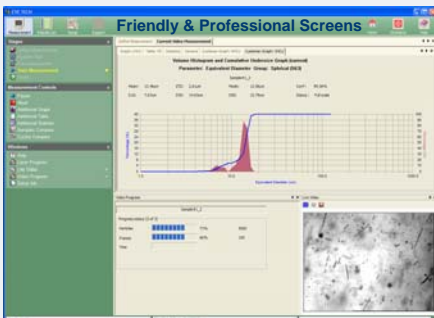


### Liquid Flow Controllers

The [AFC-101](#) **Automatic** Liquid Flow Controller with **peristaltic pump** for sample preparation, automatic & manual stirring, dilution, circulation, sonication, bubble removal, draining. The [AFC-8](#) Liquid Flow Controller **suspends particles uniformly**. With 100 or 15 ml glass funnel and variable stirrer. A pump is required.



**Results** include differential histograms, cumulative graphs and tables, statistical results, graph on graph comparisons, multi data display – user or SOP control.



## DRY

### Free Fall

The [PF-101/C](#) gently feeds dry powder from a vibrating bowl through the [ACM-112](#) Cell. **It doesn't alter the powder!**



### Microscope Slide

The [ACM-110](#) moves in x & y steps so that no area is measured twice or missed. KS-100 stand required. Use [PD-10](#) Powder Disperser with **any microscope** for a thin uniform layer of particles.



## SPECIAL Aerosol

The [ACM-106](#) Cell has thin air sheaths that prevent particles from adhering to the cuvette walls and blocking the laser.



### Heated Cuvette

The [ACM-111](#) Cell and HCM controller are for cuvette applications **up to 80°C / 176°F**.



**EyeTech Models** (\*with concentration measurement):

- Laser:** Size Analysis\*
- Vision:** Size Analysis\* & Video
- Comb:** Size\* & Dynamic Image Analysis
- Research:** Comb with freedom of algorithms
- Microscopy:** Image Analysis for Microscopes
- Shape:** Dynamic Image Analysis
- Fiber:** Dynamic Image Analysis for fibers

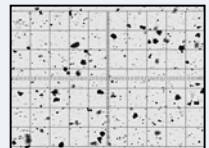
**Fully compliant with ISO standards** 9276-1, 9276-2, 9276-4, 9276-5 (Representation of results), 13322-1 (Image analysis) and 13323-1 (Single-particle light interaction methods).



Real-time Vision  
EW lens: 1 square = 735.2 x 735.2 µm

Minimum Feret (µm)	Local (%)	Stairing result	Underize (%)	Overize (%)
0.00 - 150.00	1.65	3.30	1.65	98.36
150.00 - 300.00	2.30	4.60	2.30	95.06
300.00 - 425.00	3.95	7.91	3.95	88.06
425.00 - 500.00	14.11	28.22	14.11	77.78
500.00 - 600.00	8.45	16.90	8.45	52.23
600.00 - 800.00	3.64	7.27	3.64	1.99

Excellent correlation with sieving!



**EyeTech - more accuracy, particles, mediums, applications, R&D & QA/QC solutions, speed and ROI!**