

2008



**PARTICLE SIZE DISTRIBUTION ANALYSES**

**LASER Diffraction**

- Malvern Mastersizer S & 2000 - Wet & Dry Dispersion Modules
- Beckman Coulter LS13 320 - Wet & Dry Dispersion Modules
- Microtrac X-100 – Wet Module

Dry powders, particles that can be suspended in liquids such as water, organic solvents, etc., Aerosols produced by nozzles (Volume weighted distribution standard)

**Electrozone (Coulter Counter Technique)**

- Micromeritics Elzone Model II & 80x4

Statistical analysis on a Volume and Number basis

Particle concentration in a liquid suspension, additional

**Light Obscuration / Photozone**

- Particle Sizing Systems AccuSizer Model 770

Statistical analysis on a Volume and Number basis (lower detection limit 1µm)

Statistical analysis on a Volume and Number basis (lower detection limit 0.5µm)

Particle concentration in a liquid suspension, additional

**Photon Correlation Spectroscopy/Dynamic Light Scattering**

- Malvern Zetasizer Nano
- Microtrac UPA 150
- Nicomp 380/ZLS

Submicron analytical technique for dyes, latex emulsions, proteins, oil/water emulsion, pigments, etc. (Volume or Intensity distribution standard)

**Particle Size and Shape Analysis**

- Beckman Coulter RapidVue

Distribution analysis by size/shape (Number, Volume, Sphericity and/or Aspect Ratio)

Additional Parameters available

**Sieve Analyses**

- Alpine Air Jet Sieve
- Standard 8" diameter sieve stack (for large volume samples of dry powders, up to 7 sieves)
- ATM Sonic Sifter sieve stack (45 microns and above, up to 6 sieves)
- ATM Sonic Sifter (below 45 microns/per sieve size, up to 3 sieves)
- Wet sieve stack (up to 7 sieves)

**Photozone**

- HIAC/Royco Model 8000A Analyzer & 3000 Sampler

Statistical analysis on a Number basis generally for particles in liquids with a low concentration

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## **PARTICLE SIZE DISTRIBUTION ANALYSES *continued***

### **Aerodynamic**

- **TSI Aerosizer LD 8050 using Aerodisperser Module**

Volume and Number distribution data is reported based on the aerodynamic time of flight and equivalent spherical diameter

True Density of the sample powder (Required, unless provided by client)

- **ASME Standard Method via BAHCO**

Mass distribution data reported on the basis of the aerodynamic terminal settling velocity in inches per minute and equivalent spherical diameter

True Density of sample powder (Required, unless provided by client)

Analysis with Sample Fraction Collection

### **Air Permeability Diameter**

- **Fisher Sub-Sieve Sizer**

Based on resistance of a uniformly packed column to the flow of a regulated stream of dried air

### **Sedimentation**

- **Sedigraph Model 5110**

Statistical analysis of inorganic particulate sedimenting in an appropriate fluid  
(Volume weighted distribution standard)

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## **SURFACE AREA & PORE SIZE ANALYSES**

### **B.E.T. Specific Surface Area (Nitrogen Gas Physisorption)**

- **Micromeritics Flowsorb II 2300 (Dynamic Flow Technique)**
- **Micromeritics TriStar 3000 (Static Pressure / Volumetric Technique)**
- **Quantachrome Autosorb 1 & 3B (Static Pressure / Volumetric Technique)**

1 – Point Analysis

3 – Point Analysis

5 – Point Analysis

### **B.E.T. Specific Surface Area (Krypton Gas Physisorption)**

- **Quantachrome Autosorb 3B (Static Pressure / Volumetric Technique)**

1 – Point Analysis

3 – Point Analysis

5 – Point Analysis

### **Pore Size Distribution & Structure (Nitrogen Gas Physisorption) Includes B.E.T.**

- **Micromeritics TriStar 3000 (Static Pressure / Volumetric Technique)**

Pore diameter range ~7 - 4000 angstroms (0.0007 - 0.4 microns)

10 – Point Adsorption and Desorption Isotherm (and related statistics)

20 – Point Adsorption and Desorption Isotherm (and related statistics)

40 – Point Adsorption and Desorption Isotherm (and related statistics)

### **Mercury Intrusion Porosimetry**

- **Micromeritics Autopore IV**

Pore diameter range ~0.004 - 200 microns

Intrusion Run and Related Statistics

Extrusion Hysteresis Run, additional

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## MICROSCOPY SERVICES

### Image Analysis

- Image-Pro PLUS
- Clemex
- Malvern PharmaVision

Distribution analysis by size/shape (Number, Volume, Length, Width, Aspect Ratio, Roundness/Sphericity)

Custom Parameters available

### Photomicroscopy (Transmitted or Reflected Light)

Printed photos

### Scanning Electron Microscopy

Non cGMP Analysis

cGMP Analysis

Particle Size Analysis via SEM Photos

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## PHYSICAL MEASUREMENTS

### Powder Flowability Study

- Freeman FT4 Powder Rheometer

Includes 9 analyses per sample - Basic Flow Energy & Variable Flow Rate (Run in Triplicate), Effects of Compaction (Tapping vs. Direct Pressure) and Aeration (Graphic and tabular results)

Shear Cell, additional

### Thermogravimetry (Conducted in Nitrogen environment)

- Netzsch Tarsus TG 209 F3

TGA - Temperature Capability Range: Room Temp to 1000°C

### Differential Scanning Calorimetry (Conducted in Nitrogen environment)

- Netzsch Maia DSC 200 F3

DSC - Temperature Capability Range: -85°C to 600°C

TGA & DSC Bundle

### Zeta Potential (Dispersion Characterization)

- Malvern Zetasizer Nano
- Nicomp 380/ZLS

Aqueous suspension samples with approximate particle sizes < 1µm

Organic Carrier Suspensions

Bundle with particle size analysis on Zetasizer Nano

### Density

True Density (Helium Pycnometer)

Bulk Density

Tap Density

### Solids

Total Suspended

Total Dissolved

Filter Weights (Methodology not associated with US EPA Method #5)

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## **PHYSICAL MEASUREMENTS** *continued*

<b>Miscellaneous</b>
Conductivity
pH
Loss on Drying
Angle of Repose
Loss on Ignition
Sample Splitting by Large or Micro Rotary Riffler
Refractive Index (Liquids or Crystals)

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## **OTHER SERVICES & FEES**

<b>Method Services</b>
Method Development
Method Validation
Method Transfer

<b>Specialized Services</b>
Consulting (Hourly Rate)
Lab Visit with Sample Analysis (Cost of Analysis + Hourly Rate for Consultant)
Presentations
Training

(630) 969-2703



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