PAMAS Particle Counter - Explanation of Data Reported

(Terminology, abbreviations and calculations shown on reports)

*Philip E. Plantz, PhD*
*And*
*Patrick Davis*

Applications Note

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Provided By:
Microtrac, Inc.
Particle Size Measuring Instrumentation
PAMAS particle count data include many values that are essential to developing particle size distribution specifications and evaluating data. Each of these items is explained as well as changes to be expected. The display provides a quick look at values while actual printed reports provide hard copies for storage. Please contact Microtrac, Inc at 727 – 507 – 9770 in Largo, FL for further assistance.

### PARTICLE SIZE DATA and INFORMATION

#### Sizes
- The default unit for size is micrometers (microns). The sizes in this table are not customizable and are determined by the optical design and software of the instrument.

#### Measurement File
- Name and location on the computer for the file containing the saved data

#### Sample ID
- Name and/or labeling on the sample provided for measurement.

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Customer – Formal name of the customer/client providing the sample being measured.

Sampling Location – Instrument location at which measurements are performed.

Sampling Date – Date measurements were performed
Measured At – Date or location at which samples were obtained by client/ customer. This may contain other identifying information.

User – Person performing the measurements.

Comment – Location where various comments on the sample, measurement conditions, other observations, etc. are optionally made by the operator.

Print – Expresses the data presentation venue.

Measured Volume – Volume of sample actually used for measurement.

Analyzed Volume – Total volume of sample available from which “Measured Volumes” are obtained for measurement.

Dilution Factor – Excessive numbers of particles can cause errors in instrument optimum functioning. Under these conditions and when possible, samples are diluted to an extent that allows optimum instrument performance by assuring that best possible functioning limits are considered and maintained.

Diameters – The measured diameter of each particle that has passed through the optical sensor. The particle is in motion and tumbling. Thus the reported particle size is an average of all “views” of the particle. The measurement takes advantage of the concept that a “shadow” is developed when a solid object passes through a source of illumination such as a laser beam. The averaged size of the shadow developed on a sensor is related to a voltage developed by the sensor due to loss of illumination by the laser beam. The measurement is considered a “Single Particle Counter” as compared to laser diffraction measurements which are “ensemble measurements” (measurement and requirement for many particles passing through the laser beam).

Cumulative – The cumulative distribution number of particles is developed from the differential distribution. Each number of particles in the differential distribution is added to the next so that the total number of particles “accumulates”. The cumulative distribution shows the total number of particles in the volumes measured under the conditions described in “Differential”.

Differential – Provides the number of particles having diameters between the shown sizes. In the above example there are 274 particles between sizes 2.1 – 3.1 microns in the measured volume of 10.0 ml. No dilution is recorded. Since the total volume of available sample is 10 ml, the count between sizes is that for the entire sample. The data are provided as both tabular and graphical representations.

Graphs – The graphs show the sizes on the x-axis. The sizes are according to optical design. The y-axis shows the number of particles using a logarithmic base 10 scale. The “log” scale is used to allow presentation of the data since a linear scale would lead to a very long scale unable to be shown conveniently.

ISO 4406, NAS 1638, SAE 749D – Written standards for measuring particulate contamination levels in fluids.