



Comparison of Spectrex Laser Particle Counter with Coulter Counter and Pipette Sizing Methods

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Abstract

A new optical method for size analysis using a focused laser beam was compared to Coulter Counter and pipette sizing methods. The Spectrex Laser Counter is rapid, not destructive, can be used on suspended sediment in any clear liquid, and measures grain sizes from 1 to 100 microns. For best results, particle concentrations should be less than 1,000 particles per ml. Fifteen sediment samples were analyzed by Laser and Coulter Counter methods. Laser Counter precision is very good with variation between replicates less than 5%. The Kolmogorov-Smirnov test, used to compare cumulative percent-frequency distributions, revealed no significant differences between the results of both methods.

Because Laser Counter and pipette methods measure different properties, accurate correlation of the particle phi size percent and the weight phi size percent is difficult. In order to compare the results of both methods, laser counts were converted to weight percent by using calculated particle volume and density. Correlations between pipette and converted laser data were reasonable for 12 of the samples, fair to poor for remaining 8.

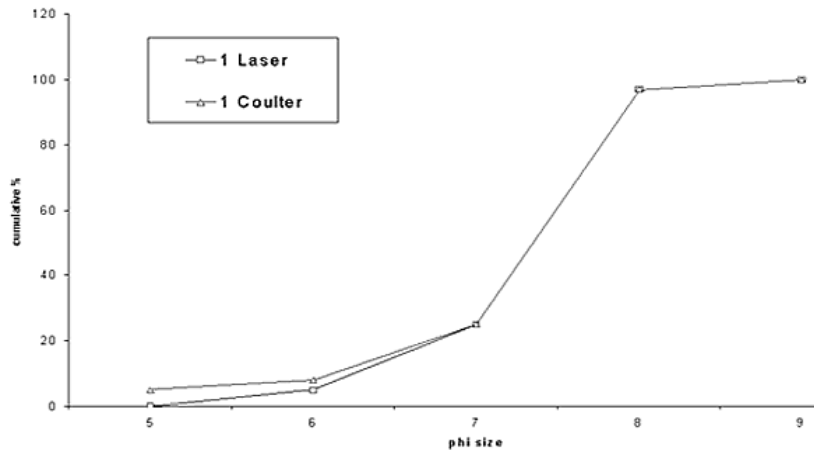
Conclusion

The Laser Particle Counter is a rapid nondestructive method for size analyzing sediment from 1-100 microns. A sample is prepared in a clear glass container of 5-10 cm diameter and is placed in the counter for laser scanning. The particle concentration and size distribution data in table and graph (histogram) are obtainable in a matter of seconds. The reproducibility of the instrument is well within 5%.

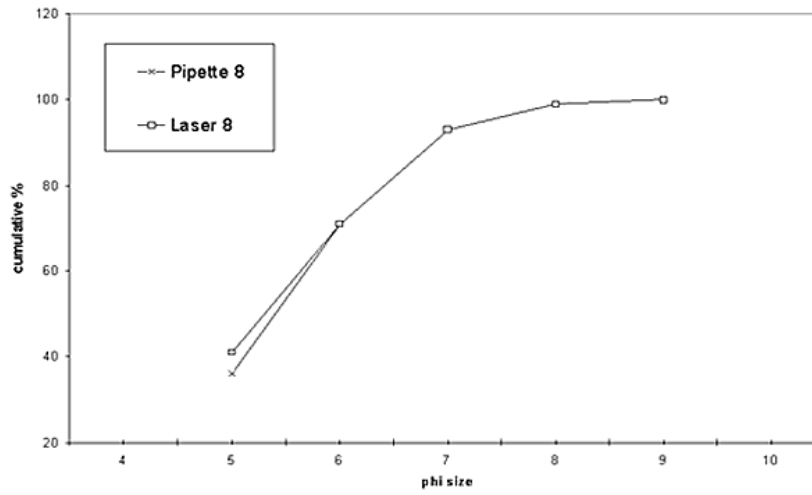
Both Laser and Coulter Counters record size data as particle counts, therefore: the phi size distributions obtained from both methods can be compared. Results from both methods were statistically the same.

Particle count data from the Laser Counter was converted to weight percent data by using the particle diameter and an assumed density of 2.65gm/cc. Although calculated weight percent data of the Laser Counter can not be compared statistically to weight percent data from pipette method, 12 of the 20 samples when compared were very similar. The remaining 8 samples showed moderate to poor correlation. Pipette results or assumptions used in converting count data to weight percent may be in error. Further analyses would be necessary before any definitive statement can be made comparing Laser to pipette.

Sample 1



Sample 2



Sample 3

