

AquaPrep™ 055

Particle Size Analysis Water Preparation System

Particle size measurement instruments typically employ deionized or even untreated water as a suspension medium for particle dispersion during analysis. Usually, this water contains undesirable levels of dissolved gases, most often those commonly present in the atmosphere. During analysis, these gases can come out of solution, forming minute bubbles that can have important effects on the analytical results. Regardless of the relative size of the bubbles, their presence distorts the reported distribution of sizes; it also degrades the repeatability of analyses.

There are available, with some instrumentation, software routines that attempt to subtract or nullify the effects of bubble distortions during analysis. These routines are inadequate in that they can only estimate dissolved gas concentrations, with no calibration reference whatsoever. Consequently, they serve to incorrectly manipulate the data, providing inaccurate results. Only the removal of the actual cause of the distortion – the bubbles themselves – can provide true and accurate analysis.



The more powerful the analyzer, the more pronounced these effects can be. When using a highly sensitive instrument such as the Micromeritics Saturn DigiSizer®, removal of the dissolved gases (that subsequently lead to bubble formation) is therefore extremely desirable for obtaining the most accurate particle size data possible. The Micromeritics AquaPrep is a highly-effective system for freeing water of dissolved gases for use with the Saturn DigiSizer.

The AquaPrep recirculates water through a hydrophobic capsule consisting of many thin-walled capillaries. A vacuum pump provides low pressure on the outside of the capillaries, causing a diffusion of

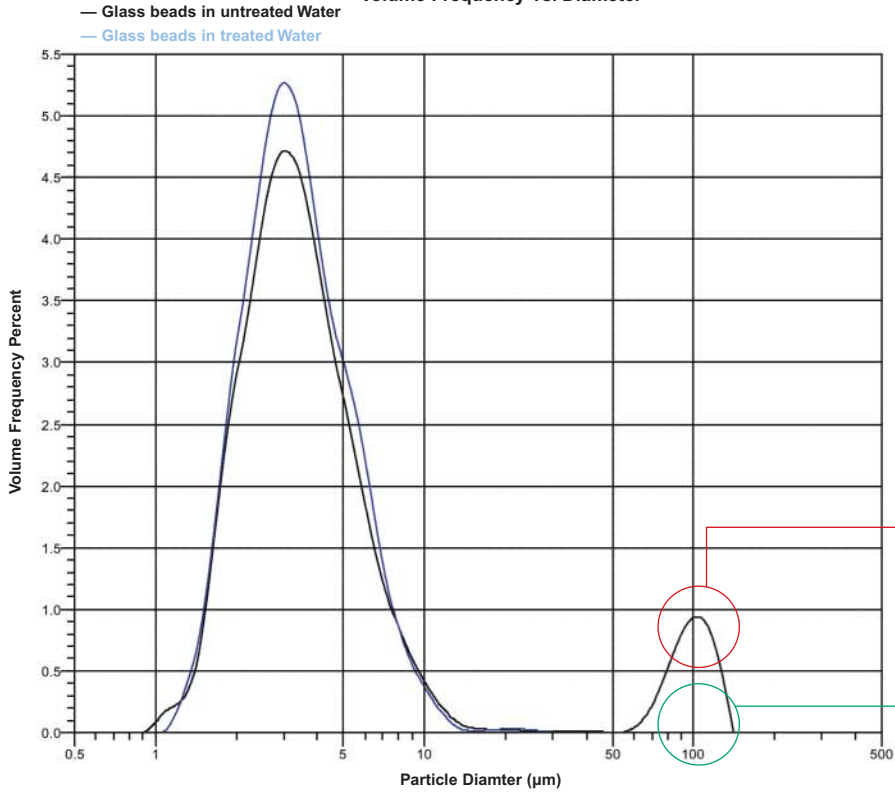
dissolved air from the water through the capillary walls and into the vacuum pump. The air removed from the water is subsequently exhausted through a small tube at the front of the instrument, which is connected to a bubbler-type apparatus for performance monitoring. During typical operation, the AquaPrep can prepare approximately 5 liters of water for analysis in less than 2 hours. Because air bubbles scatter light as do particles, the AquaPrep enhances even further the high-accuracy analysis of small particles. Its compact, rugged, and reliable design make it ideal for use in a wide variety of aqueous particle-sizing applications.

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The Science and Technology of Small Particles™

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Volume Frequency vs. Diameter

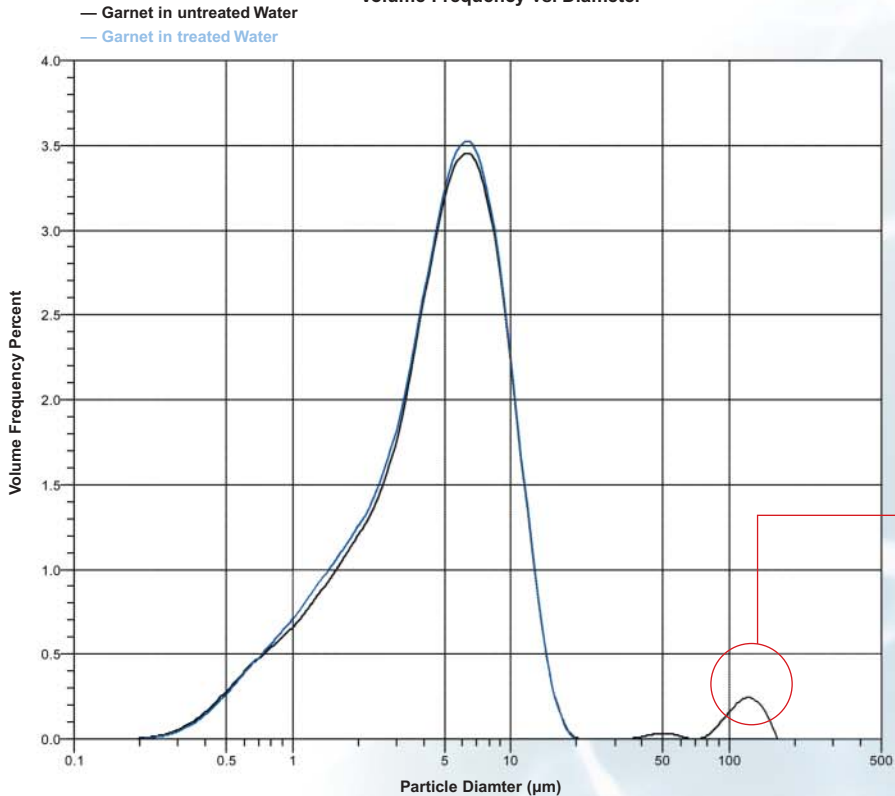


A particle size distribution comparison of glass beads analyzed in untreated and treated water. Notice the outlier peak caused by the bubbles; this could easily be confused as a characteristic of the sample material.

Outlier peak of analysis with untreated water is the result of bubbles.

After treatment with the AquaPrep, the outlier peak is completely eliminated and the true distribution of the particles is obtained.

Volume Frequency vs. Diameter



A particle size distribution comparison of garnet powder analyzed in untreated and treated water.

The outlier peak is caused by bubbles that may be mistaken as a characteristic of the sample material.

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