



PARTICLE SIZE ANALYSIS OF SILICA

Summary

Structural ceramic

Alumina (aluminum oxide, Al_2O_3) has widespread use in the ceramics industry for refractory materials, abrasives, and porcelain. Many different sizes and chemically modified grades are available. Particle size affects the manufacturing and mechanical properties of these components, including packing density and mechanical strength of the final part. These materials are usually dispersed in water for measurement, with surfactant added to prevent agglomeration.

Silica is a common mineral product with a wide range of applications from abrasives to fillers to performance-enhancing additives. Silicon dioxide comes in several forms, fused and quartz being the most popular. The crystalline quartz silica has a refractive index value of 1.54, whereas fused silica has a value of 1.46. Depending on the application, silica may be produced in a number of different methods and purities.

High purity requirements such as CMP polishing abrasives require sub-micron sizes and are normally produced by precipitation or fuming. Most general purpose or larger size silicas would be produced by classifying or grinding a natural source of silica such as sand or quartz.

Amorphous silica is used in many applications. It is used in the manufacture of glass, ceramics and refractory products, all of which have important properties determined by their microscopic particle size distribution. Large particles decrease the strength and toughness of a material and make it brittle. Smaller particles, on the other hand, increase strength and toughness and produce a more ductile material.

Small sized silica is one of the main ingredients in fake marble and plastic. If the particle size is too large, a "grit" look and feel will show up in the final product.

Particle size analysis of the silica material will allow the user to track a number of final performance characteristics such as substrate removal rates for an abrasive or surface finish for a coatings additive.

Examples of two ground silica materials are shown below. These materials were all dispersed in water with 0.1% sodium hexametaphosphate. Ultrasonic energy was used to achieve complete dispersion.

Analytical test method

RI (particle):

Viscosity: (for LB applications)

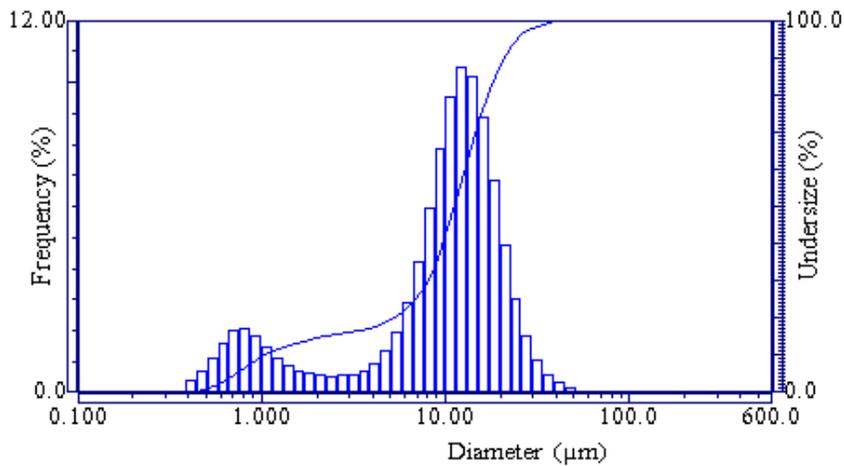
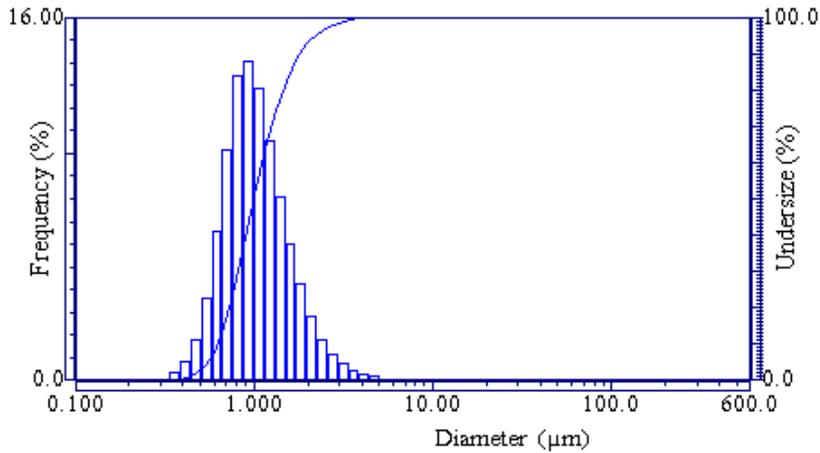
Dispersant fluid: Fluid, surfactant (concentration), pH, temperature

Sonication: XX seconds, power X

Circulation speed: X

Agitation speed: X, continuous/intermittent

Notes: Any extra information about how to prepare or run the sample



Example data

File Name:

Median: X μm

Mean: X μm

S. D.: X μm

D(10%): X μm

D(90%): X μm

Discussion: Any interesting or useful information about the example data. Do we have any specific advantages over the competition?

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