Silicon Dioxide
SiO_2xH_2O

Anhydrous 60.08

» Silicon Dioxide is obtained by insolubilizing the dissolved silica in sodium silicate solution. Where obtained by the addition of sodium silicate to a mineral acid, the product is termed silica gel; where obtained by the destabilization of a solution of sodium silicate in such manner as to yield very fine particles, the product is termed precipitated silica. After ignition at 1000° for not less than 1 hour, it contains not less than 99.0 percent of SiO_2.

Packaging and storage— Preserve in tight containers, protected from moisture.

Labeling— Label it to state whether it is silica gel or precipitated silica.

Identification— Transfer about 5 mg to a platinum crucible, mix with about 200 mg of anhydrous potassium carbonate, ignite at a red heat over a burner for 10 minutes, and cool. Dissolve the melt in 2 mL of recently distilled water, warming if necessary, and slowly add 2 mL of ammonium molybdate TS: a deep yellow color is produced.

pH ⟨ 791 ⟩: between 4 and 8, in a slurry (1 in 20).

Loss on drying ⟨ 731 ⟩ **—** Dry it at 145° for 4 hours: it loses not more than 5.0% of its weight.

Loss on ignition ⟨ 733 ⟩ **—** Ignite about 1 g of it, previously dried and accurately weighed, at 1000° for not less than 1 hour: it loses not more than 8.5% of its weight.

Chloride ⟨ 221 ⟩ **—** Boil 5 g in 50 mL of water under a reflux condenser for 2 hours, cool, and filter. A 7-mL portion of the filtrate shows no more chloride than corresponds to 1.0 mL of 0.020 N hydrochloric acid (0.1%).

Sulfate ⟨ 221 ⟩ **—** A 10-mL portion of the filtrate obtained in the test for *Chloride* shows no more sulfate than corresponds to 5.0 mL of 0.020 N sulfuric acid (0.5%).

Arsenic, *Method I* ⟨ 211 ⟩ **—** Prepare the *Test Preparation* as follows. Transfer 4.0 g to a platinum dish, add 5 mL of nitric acid and 35 mL of hydrofluoric acid, and evaporate on a steam bath. Cool, add 5 mL of perchloric acid, 10 mL of hydrofluoric acid, and 10 mL of sulfuric acid, and evaporate on a hot plate to the production of heavy fumes. Cool, cautiously transfer to a 100-mL beaker with the aid of a few mL of hydrochloric acid, and evaporate to dryness. Cool, add 5 mL of hydrochloric acid, dilute with water to about 40 mL, and heat to dissolve any residue. Cool, transfer to a 100-mL volumetric flask, dilute with water to volume, and mix. A 25.0-mL portion of this solution meets the requirements of the test. The limit is 3 ppm.

Heavy metals, *Method I* ⟨ 231 ⟩ **—** Transfer 16.7 mL of the solution prepared for the test for *Arsenic* into a 100-mL beaker, and neutralize with ammonium hydroxide to litmus paper. Adjust with 6 N acetic acid to a pH of between 3 and 4. Filter, using medium-speed filter paper, wash with water until the filtrate and washings measure 40 mL, and mix. The limit is 0.003%.

Organic volatile impurities, *Method IV* ⟨ 467 ⟩ : meets the requirements.

Residual solvents ⟨ 467 ⟩ **:** meets the requirements.
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Assay— Transfer about 1 g of Silica Gel to a tared platinum dish, ignite at 1000° for 1 hour, cool in a desiccator, and weigh. Carefully wet with water, and add about 10 mL of hydrofluoric acid, in small increments. Evaporate on a steam bath to dryness, and cool. Add about 10 mL of hydrofluoric acid and about 0.5 mL of sulfuric acid, and evaporate to dryness. Slowly increase the temperature until all of the acids have been volatilized, and ignite at 1000°. Cool in a desiccator, and weigh. The difference between the final weight and the weight of the initially ignited portion represents the weight of SiO_2.

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