

Bentonite (Bentonitum)

Chemical name. Bentonite; CAS Reg. No. 1302-78-9.

Description. A greyish white to cream-coloured, very fine, homogeneous powder; odourless.

Solubility. Practically insoluble in water and most organic solvents; when added to water it swells to approximately 12 times its volume.

Category. Suspending agent; viscosity-increasing agent.

Storage. Bentonite should be kept in a tightly closed container.

Additional information. Bentonite may also contain calcium, magnesium, and iron. Attention should be paid to the microbiological quality since Bentonite is of mineral origin.

Requirements

Definition. Bentonite is a natural, colloidal, hydrated aluminium silicate.

Identity tests

A. In a metal crucible fuse 0.5 g with 0.4 g of anhydrous sodium carbonate R. Add hot water to the residue and filter. (Keep the filtrate for test B.) Add a few drops of hydrochloric acid (~420 g/l) TS to the residue on the filter, dilute to 5 mL with water, and filter. To 2 mL of the filtrate add 2 mL of ammonium chloride (100 g/l) TS and 2 mL of ammonia (~100 g/l) TS; a white, gelatinous precipitate is produced which is soluble in hydrochloric acid (~420 g/l) TS, acetic acid (~300 g/l) TS, and sodium hydroxide (~80 g/l) TS, but insoluble in ammonia (~260 g/l) TS.

B. Acidify the filtrate from test A with hydrochloric acid (~420 g/l) TS and evaporate to dryness. Heat the residue with a mixture of 10 mg of calcium fluoride R and a few drops of sulfuric acid (~1760 g/l) TS; a gas is evolved which, if bubbled into water, gives a white precipitate.

Loss on drying. Dry to constant mass at 105 °C; it loses not less than 50 mg/g and not more than 150 mg/g.

Alkalinity. Shake 2 g with 100 mL of carbon-dioxide-free water R for 5 minutes using a stoppered flask. To 5 mL of the suspension add 0.1 mL of thymolphthalein/ethanol TS; a bluish colour is produced. Add 0.1 mL of hydrochloric acid (0.1 mol/l) VS and allow to stand for 5 minutes; the solution becomes colourless.

Sedimentation volume. Mix 6 g with 0.3 g of freshly calcined light magnesium oxide R and add progressively 200 mL of water. Shake for 1 hour, place 100 mL of the suspension in a graduated cylinder, and allow to stand for 24 hours; the volume of the supernatant liquid is not larger than 2 mL.

Swelling power. Transfer 100 mL of sodium laurilsulfate (10 g/l) TS to a glass-stoppered cylinder with a volume of 100 mL and add, in 20 portions, 2 g of Bentonite at intervals of at least 2 minutes, permitting each portion to settle before adding the next. Allow to stand for 2 hours; the apparent volume of the sediment at the bottom of the cylinder is not less than 22 mL.

Fineness of powder. Triturate 2 g in a mortar with 20 mL of water. Allow to swell, disperse evenly with a pestle, and dilute with water to 100 mL. Pour the suspension through a sieve with the nominal aperture size of 75 µm (sieve no. 75), and wash the sieve thoroughly with water; no grit is felt when the fingers are rubbed over the wire mesh of the sieve.