## 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.