CALCIUM SILICATE

Prepared at the 17th JECFA (1973), published in FNP 4 (1978) and in FNP 52 (1992). Metals and arsenic specifications revised at the 57th JECFA (2001). An ADI 'not specified' for silicon dioxide and certain silicates was established at the 29th JECFA (1985)

SYNONYMS INS No. 552

DEFINITION A synthetic hydrous calcium silicate or polysilicate prepared by a various reactions between siliceous material (e.g. diatomaceous earth) and natural calcium compounds (e.g. lime with varying proportions of other elements, such as magnesium, etc). The article of commerce may be further specified as to calcium and silicon dioxide contents, loss on drying, loss on ignition, pH of a 10% water slurry, bulk density, moisture, sulfate and chloride.

Chemical names Calcium silicate

C.A.S. number 1344-95-2

DESCRIPTION A very fine, white or off-white powder with low bulk density and high physical water absorption

FUNCTIONAL USES Anticaking agent

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Insoluble in water and ethanol

Test for silicate Mix about 500 mg of the sample with about 200 mg of anhydrous sodium carbonate and 2 g of anhydrous potassium carbonate, and heat the mixture in a platinum or nickel crucible until it melts completely. Cool, add 5 ml of water, and allow to stand for 3 min. Heat the bottom of the crucible gently, detach the melt, and transfer it to a beaker with the aid of about 50 ml of water. Add gradually hydrochloric acid until no effervescence is observed, then add 10 ml more of the acid, and evaporate the mixture on a steam bath to dryness. Cool, add 20 ml of water, boil and filter the mixture through an ash-free filter paper. An insoluble residue of silica remains. (Note. Retain the filtrate for the test for calcium). Transfer the gelatinous residue into a platinum dish, and cautiously add 5 ml of hydrofluoric acid (Warning: toxic, corrosive, must not contact skin; work under fume hood). The precipitate dissolves. (If it does not dissolve, repeat the evaporation with hydrofluoric acid.) Heat and hold in the vapours a glass stirring rod with a drop of water on the tip. The drop becomes turbid.

Test for calcium Neutralize the filtrate obtained in the Test for silicate with ammonia TS using 2 drops methyl red TS as indicator. Then add dilute hydrochloric acid TS dropwise until the solution is acid. Upon the addition of ammonium oxalate TS a white granular precipitate of calcium oxalate forms. This precipitate is insoluble in acetic acid but dissolves in hydrochloric acid.

PURITY

Fluoride (Vol. 4)	Not more than 50 mg/kg Weigh 1 g of the sample to the nearest mg, and proceed as directed in the Limit Test (Method I or II)
Asbestos	Absent Electron microscope method (Tentative): Prepare a sample to be as homogeneous as possible. Examination of a specimen of the sample from a minimum of 100 fields of view using a transmission electron microscope fails to reveal any fibrous material. (Information needed on detection limit; information also requested on a simpler, more practical method).
Lead (Vol. 4)	Not more than 2 mg/kg Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, “Instrumental Methods.”