ALUMINIUM SILICATE
(TENTATIVE)

Tentative specifications prepared at the 77th JECFA (2013) and published in FAO JECFA Monographs 14 (2013), superseding specifications prepared at the 57th JECFA (2001) and published in the Combined Compendium of Food Additive Specifications, FAO JECFA Monographs 1 (2005). A PTWI of 2 mg/kg bw for total aluminium was established at the 74th JECFA (2011). The PTWI applies to all aluminium compounds in food, including food additives.

Information required on:

- *the use as food additive:*
- *Composition and methods of manufacture*
  C.A.S. number and chemical formula
- *Functional uses other than anticaking agent, if used*
- *Data on loss on drying, loss on ignition and pH of a slurry in water*
- *Data, on a minimum of five batches, on the content of calcium, aluminium and silicon using the proposed "Method of assay"*
- *Data on lead, arsenic and mercury content, in a minimum of five batches, carried out in the impurities soluble in 0.5 M hydrochloric acid using the proposed methods.*

SYNONYMS Kaolin, light or heavy; INS No. 559

DEFINITION A native hydrated aluminium silicate, free from most of its impurities carried out by elutriation and drying.

Chemical names Aluminium silicate

C.A.S. number Information required

Chemical formula Information required

Assay Information required
Not less than XX% and not more than XX% of Al, and not less than XX% and not more than XX% of Si on the dried basis.

DESCRIPTION A soft, whitish powder free from gritty particles; odourless

FUNCTIONAL USES Anticaking agent

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Insoluble in water, ethanol and mineral acids

Plasticity To 8 g of the sample add 5 ml of water and mix well. The mixture is plastic

Test for aluminium Passes test
See description under TESTS

Test for silicon	Passes test See description under TESTS

PURITY

pH	Information required
Loss on drying (Vol. 4)	Information required
Loss on ignition (Vol. 4)	Information required
Water soluble substances	Not more than 0.3% See description under TESTS
Acid soluble substances	Not more than 2% See description under TESTS
Impurities soluble in 0.5 M hydrochloric acid	Lead : Information required Arsenic: Information required Mercury: Information required See description under TESTS

TESTS

IDENTIFICATION TESTS

Test for aluminium and silicon	Prepare the test solution as shown under method of assay. Analyze aluminum and silica in the test solution by ICP-AES technique (Vol. 4). Set instrument parameters as specified by the instrument manufacturer, use the analytical lines for Al (396.15 nm) and Si (251.611 nm).

PURITY TESTS

Water soluble substances	Weigh 5 g of the sample to the nearest mg, and boil with 50 ml of water for 30 min, adding water from time to time to maintain approximately the original volume. Filter, evaporate the filtrate to dryness, dry at 105° for 1 h, and weigh. % Water soluble substances = m/[10 x W] where m is the weight of the residue, in mg; and W is the weight of the sample, in g.

Acid soluble substances

Weigh 2 g of the sample to the nearest mg, and boil with 100 ml of dilute hydrochloric acid TS under a reflux condenser for 15 min, cool, and filter. Evaporate 50 ml of the filtrate to dryness, then ignite gently to constant weight.

% Acid soluble substances = m/[5 x W]

where
m is the weight of the residue, in mg; and
W is the weight of the sample, in g.

Impurities soluble in 0.5 M hydrochloric acid

Extract 20 g of finely ground sample under reflux conditions (to prevent loss of mercury) with 100 ml of 0.5 M hydrochloric acid (spectroscopic grade) for 30 min. Let solution cool, then filter through a 0.1 µm membrane filter. Wash the filter twice with hot 0.5 M hydrochloric acid. Combine the filtrate and wash solution in a 200 ml volumetric flask and make up to volume with 0.5 M hydrochloric acid.

Determine arsenic using an AAS (Hydride generation) technique; lead using an AAS (Electrothermal atomization) technique; and mercury using an AAS (Cold vapour generation) technique. See “Metallic impurities” in the Combined Compendium of Food Additive Specifications (Volume 4).

METHOD OF ASSAY

Weigh about 0.5 g of the sample to the nearest 0.1 mg, in a platinum or nickel crucible, add 5 g potassium hydroxide and 2 g boric acid, Mix and melt completely using a torch burner and allow to stand at room temperature. Place the reaction product along with crucible into 150 ml hot deionized water in a 250-ml PTFE beaker and dissolve residue by agitation. Wash the crucible with hot deionized water and remove it. Add 50 ml hydrochloric acid and transfer the contents into a 250-ml polypropylene volumetric flask. Wash the beaker three times with hot deionized water, transfer the washings to the volumetric flask and make up to volume. Dilute with 2% hydrochloric acid and prepare the test solution. Analyse aluminium and silica in the test solution by ICP-AES technique (Vol. 4). Set instrument parameters as specified by the instrument manufacturer. Use analytical lines for Al (396.152 nm) and Si (251.611 nm) and construct standard curve using standard solutions 0.2 – 5.0 µg/ml each. Read the concentration of Al and Si in sample solution (as µg/ml) and calculate the aluminium and silicon content of the sample using the formula:

$$\text{Al or Si (\%)} = \frac{C \times 250 \times DF}{W \times 10^6} \times 100$$

Where: C is concentration of Al or Si in the test solution, µg/ml
W is weight of sample, g
DF is dilution factor