CALCIUM 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 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 Aluminium calcium silicate; calcium aluminosilicate; calcium silicoaluminate; aluminosilicic acid calcium salt; silicic acid aluminum calcium salt; INS No. 556

DEFINITION Information required

Chemical names Aluminium calcium silicate

C.A.S. number Information required

Chemical formula Information required

Assay Information required
Not less than XX% and not more than XX% of silicon (Si)
Not less than XX% and not more than XX% of aluminium (Al)
Not less than XX% and not more than XX% of calcium (Ca)

DESCRIPTION Fine, white, free-flowing powder

FUNCTIONAL USES Anticaking agent

CHARACTERISTICS

IDENTIFICATION

Test for calcium Passes test
See description under TESTS

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)	Not more than 10% (105°, 2 h)
Loss on ignition (Vol. 4)	Not less than 14% and not more than 18% (ignition at 1000° to constant weight)
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 Fluoride Limit Test (Method III).
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 calcium, 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 Ca (393.366 nm), Al (396.15 nm) and Si (251.611 nm).

PURITY TESTS

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 (Solution A). Prepare the test solution by diluting Solution A with 2% hydrochloric acid, to get the readings within the standard curve range. Analyze silica, aluminium and calcium in the

test solution by ICP-AES technique (Vol. 4). Set instrument parameters as specified by the instrument manufacturer, use the analytical lines for Si (251.611 nm), Al (396.152 nm) and Ca (393.366 nm) and construct standard curve using standard solutions 0.1 – 5.0 µg/ml each. Read the concentration of Si, Al and Ca in test solution (as µg/ml) and calculate the silicon, aluminium and calcium content of the sample using the formula:

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

Where

C is concentration of Si, Al or Ca in the test solution, µg/ml;
DF is dilution factor for the dilution of Solution A to test solution
W is weight of sample, g