POTASSIUM ALUMINIUM SILICATE
(TENTATIVE)

New tentative specifications prepared at the 74th JECFA (2011), published in FAO Monographs 11 (2011). A PTWI of 2 mg/kg bw for aluminium was established at the 74th JECFA (2011).

Information required:

- *On the preparation and purification methods of potassium aluminium silicate to be used in the manufacture of pearlescent pigments.*
- *Methods for the identification of silicate and aluminium in potassium aluminium silicate*
- *Data from five batches of potassium aluminium silicate on particle size distribution and the levels of the contaminants (arsenic, mercury, lead, antimony, cadmium, zinc, barium, chromium, copper and nickel).*
- *Method for the determination of lead, antimony, cadmium, zinc, barium, chromium, copper and nickel in potassium aluminium silicate using Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES). Indicate if method involves digestion or only extraction of the impurities from the sample.*
- *Suitability of proposed method for the determination of mercury using digestion under a closed system followed by a cold vapour generation technique and analysis with atomic absorption spectrometry.*
- *Suitability of proposed Assay method which incorporates alkali fusion coupled with ICP-AES for the determination of levels of aluminium for use in the assay of potassium aluminium silicate.*

SYNONYMS Mica; Muscovite

DEFINITION Potassium aluminium silicate is mined from natural sources and then further purified. It is used as a carrier substrate for pearlescent pigments made with titanium dioxide and/or iron oxide.

Chemical names Potassium aluminium silicate

C.A.S. number 12001-26-2

Chemical formula $KAl_2[AlSi_3O_{10}](OH)_2$

Formula weight 398.31

Assay Not less than 98%

DESCRIPTION Colourless needles or white free flowing powder, having a slight characteristic odour and showing no change in colour after heating for 90 minutes at 105°.

FUNCTIONAL USES Carrier

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4)	Insoluble in water, dilute acids and alkali
Aluminium	Information required
Silicate	Information required

PURITY

Loss on drying (Vol. 4)	Not more than 0.5% (105°, 2 h)
Arsenic (Vol. 4)	Information required Mix 1 g of substance in a conical flask with 5 g of potassium hydrogen sulfate and add 5 ml of sulfuric acid (98%). Heat carefully until white fumes are formed and allow to cool to room temperature. Add 10 ml of water and 4.5 ml of hydrochloric acid (25%). Filter through filter paper and wash residue with hot water. Dilute filtrate with water to 50 ml in a volumetric flask. Determine arsenic using atomic absorption hydride technique.
Mercury (Vol. 4)	Information required Digest 0.5 g of sample under closed conditions by heating under reflux with sulfuric and nitric acids and make up to a known volume with deionized water. Alternatively, a closed vessel microwave digestion system may be used for the digestion of samples. Determine the mercury content by cold vapour atomic absorption technique.
Lead (Vol. 4)	Information required
Antimony (Vol. 4)	Information required
Cadmium (Vol. 4)	Information required
Zinc (Vol. 4)	Information required
Barium (Vol. 4)	Information required
Chromium (Vol. 4)	Information required
Copper (Vol. 4)	Information required
Nickel (Vol. 4)	Information required

TESTS

METHOD OF ASSAY Information required as to suitability of Assay method proposed below.

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 (alkali fusion) and allow to stand at room temperature. Place the reaction product along with crucible in a 250-ml PTFE beaker, add 150 ml hot deionized water and dissolve residue by agitation. Wash the crucible with a small amount of hot water and add the washings to the beaker. Add 50 ml hydrochloric acid and transfer the contents into a 250-ml volumetric flask. Wash the beaker three times with hot 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 solution to get the solution within the linear dynamic range of the analyzer. Analyze aluminium in the test solution using ICP-AES (Vol. 4). Set instrument parameters as specified by the instrument manufacturer and use the analytical line for aluminium (396.152 nm). Determine the concentration (as µg/ml) of aluminium from the respective standard curve. Calculate the percentage of potassium aluminium silicate in the sample from aluminium using the formula below.

$$\% \text{ (w/w) Potassium aluminium silicate} = \frac{0.123 \times C_{Al} \times DF}{W}$$

where

C is the concentration of Al in the test solution, µg/ml;
DF is the Dilution Factor (dilution of Solution A to get test solution); and
W is the weight of sample, g.