

CALCIUM CHLORIDE

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SYNONYMS INS No. 509

DEFINITION

Chemical names Calcium chloride

C.A.S. number 10043-52-4

Chemical formula
Anhydrous: CaCl_2
Dihydrate: $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$
Hexahydrate: $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$

Formula weight
Anhydrous: 110.99
Dihydrate: 147.02
Hexahydrate: 219.08

Assay
Anhydrous: Not less than 93%
Dihydrate: Not less than 99.0% and not more than the equivalent of 107.0% of $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$
Hexahydrate: Not less than 98.0% and not more than the equivalent of 110% of $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$

DESCRIPTION
Anhydrous: White, deliquescent lumps or porous masses
Dihydrate: White, hard, deliquescent fragments or granules
Hexahydrate: Colourless, very deliquescent crystals

FUNCTIONAL USES Firming agent

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Anhydrous: Freely soluble in water and ethanol
Dihydrate: Freely soluble in water; soluble in ethanol
Hexahydrate: Very soluble in water and ethanol

Test for chloride (Vol. 4) Passes test

Test for calcium (Vol. 4) Passes test

PURITY

Free alkali
Not more than 0.15% as $\text{Ca}(\text{OH})_2$
Dissolve 1 g of the sample in 20 ml of freshly boiled and cooled water, and add 2 drops of phenolphthalein TS. If the solution is pink, the pink colour is discharged by adding 2 ml of 0.02 N hydrochloric acid.

Magnesium and alkali salts

Not more than 5%

Dissolve 1 g of anhydrous calcium chloride, or the corresponding weight of a hydrate, in about 50 ml of water, add 500 mg of ammonium chloride, mix and boil for about 1 min. Quickly add 40 ml of oxalic acid TS, and stir vigorously until precipitation is well established. Immediately add 2 drops of methyl red TS, then add ammonia TS dropwise until the mixture is just alkaline, and cool. Transfer the mixture into a 100-ml cylinder, dilute with water to 100 ml, let stand for 4 h or overnight, and then decant the clear, supernatant liquid through a dry filter paper. To 50 ml of the clear filtrate in a platinum dish add 0.5 ml of sulfuric acid and evaporate the mixture on a steam bath to a small volume. Carefully evaporate the remaining liquid to dryness over a free flame, and continue heating until the ammonium salts have been completely decomposed and volatilized. Finally, ignite the residue to constant weight. The weight of the residue does not exceed 25 mg.

Fluoride (Vol. 4)

Not more than 40 mg/kg (Method III)

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."

METHOD OF ASSAY

Weigh accurately about 1 g of anhydrous calcium chloride, or the corresponding weight of a hydrate, transfer to a 250-ml beaker, and dissolve in a mixture of 100 ml of water and 5 ml of dilute hydrochloric acid TS. Transfer the solution to a 250-ml volumetric flask, dilute with water to volume and mix. Pipet 50 ml of the solution into a suitable container, add 100 ml of water, 15 ml of sodium hydroxide TS, 40 mg of murexide indicator (amm. purpurate) and 3 ml of naphthol green TS, and titrate with 0.05 M disodium ethylenediaminetetraacetate until the solution is deep blue in colour. Each ml of 0.05 M disodium ethylenediaminetetraacetate is equivalent to 5.55 mg of CaCl_2 ; 7.35 mg of $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$; or 10.95 mg of $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$.