



Designation: E 449 – 96

Standard Test Methods for Analysis of Calcium Chloride¹

This standard is issued under the fixed designation E 449; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 These test methods cover the analysis of calcium chloride and solutions.

1.2 Procedures are given for the determination of calcium chloride, magnesium chloride, potassium chloride, sodium chloride, and calcium hydroxide. The test methods appear in the following order:

	Sections
Calcium Chloride	8 to 16
Magnesium Chloride, Potassium Chloride, and Sodium Chloride	17 to 26
Calcium Hydroxide	27 to 33

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in Section 5.

1.4 Review the current Material Safety Data Sheet (MSDS) for detailed information concerning toxicity, first aid procedures, handling, and safety precautions.

2. Referenced Documents

2.1 ASTM Standards:

D 345 Test Method for Sampling and Testing Calcium Chloride for Roads and Structural Applications²

D 1193 Specification for Reagent Water³

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial Chemicals⁴

E 200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis⁴

E 663 Practice for Flame Atomic Absorption Analysis⁵

3. Significance and Use

3.1 Calcium chloride is available in various forms and purities. A major use is the de-icing and dust control of roads. It is also used in the coal industry for dustproofing and freezeproofing, in foods, in electrolytic cells, and in refrigeration brines. The test methods listed in 1.2 provide procedures for analyzing calcium chloride to determine if it is suitable for its intended use.

4. Reagents

4.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, these shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.⁶ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

4.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean Type II or Type III reagent water conforming to Specification D 1193.

5. Hazards

5.1 While calcium chloride is a relatively harmless material, some of the reagents used in these methods present possible safety hazards. Potassium cyanide is extremely hazardous and must be handled with great care. In addition to being poisonous, solutions containing cyanide should never be mixed with acids to preclude the release of poisonous hydrogen cyanide gas. Concentrated hydrochloric acid and sodium hydroxide also are hazardous chemicals which may produce serious burns on contact.

6. Atomic Absorption Spectrophotometers

6.1 Photometers and photometric practice used in these methods shall conform to Practice E 663.

¹ These test methods are under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and are the direct responsibility of Subcommittee E15.02 on Product Standards.

Current edition approved Dec. 10, 1996. Published June 1997. Originally published as E 449 – 72 T. Last previous edition E 449 – 90.

² *Annual Book of ASTM Standards*, Vol 04.03.

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 15.05.

⁵ *Annual Book of ASTM Standards*, Vol 03.06.

⁶ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.