Designation: E 291 – 01

Standard Test Methods for Chemical Analysis of Caustic Soda and Caustic Potash (Sodium Hydroxide and Potassium Hydroxide)[1]

This standard is issued under the fixed designation E 291; 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 only the analyses usually required on the following commercial products:

1.1.1 Caustic soda (sodium hydroxide), 50 and 73 % liquors; anhydrous (solid, flake, ground, or powdered), and

1.1.2 Caustic potash (potassium hydroxide), 45 % liquor; anhydrous (solid, flake, ground, or powdered).

1.2 The analytical procedures appear in the following order:

Alkalinity (Total), Titrimetric (for 50 to 100 % NaOH and 45 to 100 % KOH)	8 to 14
Carbonate, Gas-Volumetric (0.001 g CO_2, min)	15 to 24
Carbonate, Gravimetric (0.001 g CO_2, min)	25 to 33
Chloride, Titrimetric, (0.001 g Cl^-, min)	34 to 40
Chloride, Potentiometric Titration (0.3 to 1.2 %)	41 to 47
Chloride, Ion Selective Electrode (0.6 to 120 ppm)	48 to 55
Iron, Photometric (0.005 mg Fe, min)	56 to 64
Sulfate, Gravimetric, (0.002 g SO_3, min)	65 to 71
Keywords	72

1.3 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are provided for information only.

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

1.5 *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 6.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water[2]

E 60 Practice for Analysis of Metals, Ores, and Related Materials for by Molecular Absorption Spectrometry[3]

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial Chemicals[4]

E 200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis[4]

3. Significance and Use

3.1 Caustic soda and caustic potash are used in a large number of manufacturing processes. The chemicals are available in several grades depending on their intended use. The test methods listed in 1.2 provide procedures for analyzing caustic soda and caustic potash to determine if they are suitable for their intended use.

4. Apparatus

4.1 *Photometers and Photometric Practice*—Photometers and photometric practice used in these test methods shall conform to Practice E 60.

5. Reagents

5.1 *Purity of Reagents*—Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[5] 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.

5.2 *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.

6. Hazards

6.1 Sodium and potassium hydroxides are caustic alkalies which, in their anhydrous or strong solution form, are hazardous materials. In contact with the skin they produce burns

[1] These test methods are under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and are the direct responsibility of Subcommittee E15.01 on General Standards.

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[2] *Annual Book of ASTM Standards,* Vol 11.01.

[3] *Annual Book of ASTM Standards,* Vol 03.05.

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

[5] *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. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

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