



Designation: E 1452 – 92 (Reapproved 1996)

Standard Practice for Preparation of Calibration Solutions for Spectrophotometric and for Spectroscopic Atomic Analysis¹

This standard is issued under the fixed designation E 1452; 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.

1. Scope

1.1 This practice covers the preparation, labeling, and storage of calibration solutions employed for calibrating atomic and molecular spectroscopic equipment used for the analysis of metals and alloys.

1.2 *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.* For specific hazards information, see Section 5.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water²

E 50 Practices for Apparatus, Reagents, and Safety Precautions for Chemical Analysis of Metals³

E 288 Specification for Laboratory Glass Volumetric Flasks⁴

E 319 Practice for the Evaluation of Single-Pan Mechanical Balances⁴

E 969 Specification for Volumetric (Transfer) Pipets⁴

2.2 *National Institute for Standards and Technology (NIST) Documents:*

Circular 602 Testing of Glass Volumetric Apparatus⁵

3. Significance and Use

3.1 Analytical instrumentation is employed extensively throughout industry for quality control, research, and development purposes. Calibration solutions are required for calibrating certain types of analytical atomic and molecular spectro-

scopic instruments. Therefore, the quality of the analytical results obtained is directly dependent on the accuracy of the calibration solutions.

3.2 It is assumed that the users of this practice will be trained analysts capable of performing common laboratory procedures skillfully and safely. It is expected that the work will be performed in a properly equipped laboratory.

4. Reagents

4.1 *Purity of Reagents*—All reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, when such specifications are available.⁶ Other grades may be used if it is first ascertained that the reagent is of sufficient purity to permit its use without lessening the accuracy or stability of the calibration solutions produced. See Practices E 50.

4.2 *Purity of Water*—Unless otherwise indicated, all water used shall be Type II (distilled water) or water of equivalent purity, in accordance with Specification D 1193.

5. Hazards

5.1 All safety precautions referenced in Practice E 50 shall be observed. Generally accepted prudent laboratory practices shall be followed.

5.2 Calibration solutions may be subject to several federal, state, and local laws and regulations, and may be subject to the regulations of some fire departments.

5.3 Other laws or regulations may be applicable, depending on the nature and concentration of the matrix and the element used to prepare the calibration solutions.

6. Calibration of Equipment

6.1 *Balances and Weights*—Calibrate balances and weights periodically, depending on use, or at least once every twelve months. Calibration shall be traceable to NIST. See Method E 319.

¹ Precision and Bias This practice is under the jurisdiction of ASTM Committee E-1 on Analytical Chemistry for Metals, Ores, and Related Materials and is the direct responsibility of Subcommittee E01.21 on Reference Materials and Liaison with S17.

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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 14.02.

⁵ Available as Order No. COM 73-10504 from the National Technical Information Services, Springfield, VA 22161.

⁶ *Reagent Chemicals, American Chemical Society Specifications*, Am. Chemical Soc., Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see Rosen, J. *Reagent Chemicals and Standards*, D. Van Nostrand Co., Inc., New York, NY, and *United States Pharmacopeia*, United States Pharmacopeial Convention, Inc., Rockville, MD.