



Designation: D 3873 – 01

## Standard Test Method for Valency State of the Arsenic Component of Ammoniacal Copper Zinc Arsenate Solutions<sup>1</sup>

This standard is issued under the fixed designation D 3873; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 This test method is intended for testing batches of concentrated ammoniacal copper zinc arsenate (ACZA) solution, prepared by air-oxidation of trivalent arsenic. The test method provides a means of confirming that oxidation has been completed and that at least 99.5 % of the arsenic has been oxidized. The sample for testing should contain  $100 \pm 20$  mg of potential  $As_2O_5$ . A 200-mL aliquot of a concentrate containing 8 to 12 % of preservative oxides is suitable.

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.*

### 2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water<sup>2</sup>

D 1325 Specification for ACA and ACZA Solutions<sup>3</sup>

### 3. Summary of Test Method

3.1 Twenty millilitres of tartaric acid solution is added to a 250 mL Erlenmeyer flask, then 2 mL of the ACZA concentrate is added. The resulting solution should be light blue-green. Next, 20 mL of sodium bicarbonate solution is added. The resulting solution will then be light blue. Next, 2 mL of the starch indicator is added. To this solution one drop of iodine solution is added by means of a buret. If the concentrate solution turns a dark blue and remains, it means the arsenic oxidation by aeration has been completed.

### 4. Significance and Use

4.1 This test method tests for the completion of oxidation by aeration which converts trivalent arsenic to pentavalent arsenic.

### 5. Reagents

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. 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.<sup>4</sup> 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 reagent water as defined in Specification D 1193.

5.3 *Iodine Solution*—Add 6.3 to 6.4 g of resublimed iodine to a 500-mL standard flask. Add 10 to 12 g of potassium iodide and not more than approximately 20 mL of water. Swirl the contents of the flask at room temperature until all the iodine has dissolved, and dilute to the graduation mark. This solution can be kept for a few weeks if stored in a tightly sealed, glass-stoppered, dark bottle in a cool place.

5.4 *Sodium Bicarbonate Solution, Saturated*—Add 45 g of sodium bicarbonate to 400 mL of water, and swirl occasionally until most of the sodium bicarbonate goes into solution. Do not use heat to dissolve the salt. This solution can be kept in a stoppered flask.

5.5 *Starch Indicator Solution*—Make a paste of approximately 1.0 g of *soluble* starch in 5 mL of water. Pour the paste into 200 mL of water, near the boiling point, and then boil for 1 min. When the solution has cooled, add a few drops of chloroform as a preservative and keep in a stoppered bottle. Some batches of starch will not dissolve properly. If the solution separates into two layers, use the clear, top layer. If the whole solution is cloudy, prepare a fresh solution, or obtain a different supply of starch.

5.6 *Tartaric Acid Solution*—Dissolve 27 g of tartaric acid in 400 mL of water.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.06 on Treatments for Wood Products.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 11.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.10.

<sup>4</sup> "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 "Reagent Chemicals and Standards," by Joseph Rosin, D. Van Nostrand Co., New York, NY, and the "United States Pharmacopeia."