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Standard Test Method for the Screening of Cyanides in Waste¹

This standard is issued under the fixed designation D 5049; 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 test method is applicable to the screening of cyanides in waste liquids, sludges, semisolids, and solids. The following test methods are included:

	Sections
Test Method A—Chloramine T	12 through 14
Test Method B—Prussian Blue	15 through 17
Test Method C—Cyantesmo Paper	18 through 20
Test Method D—Gas Detector Tube	21 through 25

1.2 This test method is designed and intended as a preliminary test to complement the more sophisticated quantitative analytical techniques that may be used to determine cyanide concentration. This test method offers, to the user, the option and the ability to "screen" waste for potentially hazardous levels of cyanide when the more sophisticated techniques are not available and the total waste composition is unknown.

1.3 *This standard does not purport to address all of the safety problems 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 information is given in Section 8 and 18.5.

2. Referenced Documents

- 2.1 *ASTM Standards:*
D 1193 Specification of Reagent Water²
D 2036 Test Methods for Cyanides in Water³
E 200 Practice for Preparation, Standardization, and Storage of Standard Solutions for Chemical Analysis⁴
2.2 *Code of Federal Regulations:*
21 CFR Part 1308⁵

3. Terminology

3.1 Description of Term Specific to This Standard:

3.1.1 *screening method*—a preliminary, qualitative, or semiquantitative test, developed from classical qualitative and quantitative techniques, that is designed to efficiently give the user specific information about a waste that will aid in determining waste identification, process compatibility, and safety in handling.

¹ This test method is under the jurisdiction of ASTM Committee D-34 on Waste Disposal and is the direct responsibility of Subcommittee D34.02 on Physical and Chemical Characterization.

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² Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 11.02.

⁴ Annual Book of ASTM Standards, Vol 15.05.

⁵ Code of Federal Regulations available from the Superintendent of Documents, United States Government Printing Office, Washington, DC 20402.

4. Summary of Test Methods

4.1 *Test Method A, Chloramine-T Method*—The presence of cyanides can be observed when cyanides react with chloramine-T reagent at pH 8 to form cyanogen chloride. The addition of barbituric acid to cyanogen chloride gives intensive red color. This test method will indicate cyanides amenable to chlorination.

4.2 *Test Method B, Prussian Blue Method*—The pH of a sample is adjusted to pH 12 with NaOH and subsequently, solutions of ferrous sulfate and ferric chloride are added. By the addition of concentrated sulfuric acid in the presence of cyanides, a deep blue color (Prussian blue) is produced. This test method will indicate the presence of free cyanide and many of the complex cyanides.

4.3 *Test Method C, Cyantesmo Paper Method*—A portion of the sample is acidified in a flask or test tube releasing the simple hydrogen cyanide gas from cyanides. The presence of hydrogen cyanide gas is indicated by a color change in the cyanide screening paper that is held just above the solution. This test method will indicate dissociable cyanide that could readily evolve hydrogen cyanide gas.

4.4 *Test Method D, Gas Detector Tube Method*—A portion of the sample is acidified in a beaker to release cyanide as hydrogen cyanide gas. The gas is funneled through a detector tube creating a color stain in the tube in proportion to the concentration of cyanide gas in the vapor. A definite color change in the detector tube indicates a positive presence of cyanide. This test method will indicate dissociable cyanide that could readily evolve hydrogen cyanide gas.

5. Significance and Use

5.1 This test method is intended for use by those in the waste management industries to determine the presence of potentially hazardous cyanides.

6. Interferences

6.1 Common interferences in the analysis for cyanide include oxidizing agents, sulfides, aldehydes, glucose, and other sugars, high concentration of carbonate, fatty acids, thiocyanate, and other sulfur containing compounds.

6.2 It is beyond the scope of these test methods to describe procedures for overcoming all of the possible interferences that may be encountered. Test Methods D 2036 can be referenced for interferences and their possible elimination.

7. Reagents and Materials

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical