



Designation: D3624 – 85a (Reapproved 2022)

Standard Test Method for Low Concentrations of Mercury in Paint by Atomic Absorption Spectroscopy¹

This standard is issued under the fixed designation D3624; 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 U.S. Department of Defense.

1. Scope

1.1 This test method covers the determination of the content of mercury in the range between 10 and 1000 ppm (mg/kg) present in liquid coatings, coatings vehicles, or in dried films obtained from previously coated substrates. There is no reason to believe that higher levels could not be determined by this test method, provided that appropriate dilutions and adjustments in specimen size and reagent quantities are made.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in Section 7 and 9.1.1.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D1193 Specification for Reagent Water

3. Summary of Test Method

3.1 The sample of liquid coating or dried film is weighed into a polytetrafluoroethylene (PTFE)-lined acid decomposition vessel and digested at an elevated temperature using sulfuric and nitric acids. Use of a sealed acid decomposition vessel prevents loss of mercury during the digestion. The

digested sample is diluted to a known volume with water and the concentration of mercury is determined using a cold-vapor, atomic absorption technique.

4. Significance and Use

4.1 The permissible level of heavy metals in certain coatings is specified by governmental regulatory agencies. This test method provides a fully documented procedure for determining low concentrations of mercury present in both water and solvent-reducible coatings to determine compliance.

5. Apparatus

5.1 *Atomic Absorption Spectrophotometer*—Any commercial instrument having an open sample presentation area in which to mount the absorption cell or an instrument designed specifically for the measurement of mercury using the cold vapor technique.

5.2 *Recorder*, 0 to 10 mV.

5.3 *Mercury Source Lamp*.

5.4 *Absorption Cell*—Standard spectrophotometer cells 100 mm long, having quartz end windows may be used. Prior to use, the cell must be positioned in the optical path of the spectrophotometer and held in place by suitable clamps or straps. The cell should be carefully aligned both vertically and horizontally to give the maximum transmittance.

5.5 *Reduction Vessel*—Cylindrical gas washing bottle, 250-mL, equipped with a coarse (40 to 60- μ m) fritted glass inlet tube and a standard-taper glass stopper. Polyethylene or poly(vinyl chloride) tubing may be used for connecting the reduction vessel to the absorption cell.

5.6 *Flowmeter*, capable of measuring a gas flow of 1 L/min.

5.7 *Drying Tube*—Approximately 150 by 20-mm (6 by 3/4-in.) glass tube filled with magnesium perchlorate. The tube should be filled each day that it is in use, and the $\text{Mg}(\text{ClO}_4)_2$ should be replaced whenever it becomes saturated (carefully observe after each analysis).

NOTE 1—Use of an indicator desiccant at the exit end of the tube will make this observation easier.

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paints and Paint Materials.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.