



Standard Test Method for TOTAL CHLORINE IN POLY(VINYL CHLORIDE) POLYMERS AND COPOLYMERS USED FOR SURFACE COATINGS¹

This standard is issued under the fixed designation D 1156; 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 method covers the determination of total chlorine in poly(vinyl chloride) polymers and copolymers used in surface coatings, regardless of how the chlorine is combined in the resin or compound.

NOTE 1—With suitable modifications, this method is applicable to chlorine-containing resins and resin solutions in general.

2. Apparatus

2.1 The Thompson-Oakdale type of halogen apparatus shall be used. The apparatus shall be made of chemically resistant glass, with interchangeable ground-glass joints.^{2,3}

3. Reagents

3.1 *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.⁴ 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.

3.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to ASTM Specification D 1193 for Reagent Water.⁵

3.3 *Copper Sulfate* ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$).

3.4 *Nitric Acid* (sp gr 1.42)—Concentrated nitric acid (HNO_3).

3.5 *Nitric Acid* (1+2)—Mix 1 volume of concentrated HNO_3 (sp gr 1.42) with 2 volumes of water.

3.6 *Nitric Acid* (3+97)—Mix 3 volumes of concentrated HNO_3 (sp gr 1.42) with 97 volumes of water.

3.7 *Potassium Permanganate Solution (saturated)*—Dissolve 10 g of potassium permanganate (KMnO_4) in 95 ml of hot water. Cool to room temperature and use the supernatant liquid.

3.8 *Potassium Persulfate*—Low-chlorine potassium persulfate ($\text{K}_2\text{S}_2\text{O}_8$).

3.9 *Silver Nitrate Solution* (30 g/litre)—Dissolve 3 g of silver nitrate (AgNO_3) in water and dilute to 100 ml. Store in a brown glass bottle.

3.10 *Sodium Arsenite Solution*—To 10 g of arsenic oxide (As_2O_3), add 110 g of sodium hydroxide (NaOH) and 800 ml of

¹ This method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings and Materials. Current edition approved Sept. 30, 1952. Originally issued 1951. Replaces D 1156 - 51 T.

² For more detailed information on this apparatus, reference may be made to the J. J. Thompson and V. O. Oakdale, "A General Method for the Determination of Halogens in Organic Compounds," *Journal of the American Chemical Society*, Vol 52, 1930, p. 1195.

³ A suitable apparatus can be purchased as a unit from the Scientific Glass Apparatus Co., under the number J-1971.

⁴ "Reagent Chemicals, American Chemical Society Specifications," Am. Chem. Soc., Washington, D. C. 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., Inc., New York, N. Y., and the "United States Pharmacopoeia."

⁵ *Annual Book of ASTM Standards*, Part 29.