



Standard Test Method for Water-Soluble Acidity or Alkalinity of Paper¹

This standard is issued under the fixed designation D 548; 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 covers the determination of the water-soluble acidity or alkalinity of paper.²

1.2 It may be applied to writing, printing, and sized industrial paper but is not intended for testing electrical insulating papers nor those containing alkaline fillers or coatings such as casein or calcium carbonate.

1.3 *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 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, or Related Product³

D 644 Test Method for Moisture Content of Paper and Paperboard by Oven Drying³

D 1193 Specification for Reagent Water⁴

D 1293 Test Methods for pH of Water⁴

D 1968 Terminology Relating to Paper and Paper Products³

E 70 Test Method of pH of Aqueous Solutions with the Glass Electrode⁵

2.2 TAPPI Standard:

T 1206 Precision statement for test methods⁶

3. Terminology

3.1 *Definitions*—Definitions shall be in accordance with Terminology D 1968 and the *Dictionary of Paper*.⁶

4. Summary of Test Method

4.1 This test method consists of a boiling-water extraction of the specimen followed by an alkalinity-acidity titration of the extract solution.

4.2 This test method, based on the work of Kohler and Hall,² measures the titratable acidity or alkalinity (end point at 7.0 pH) of an aqueous extract of paper (filtered and extracted by boiling water for 1 h). It specifies one extraction and so does not measure the total acidity or alkalinity of paper, for which exhaustive extraction is required.

5. Significance and Use

5.1 The pH determination measures the extent to which the paper alters the hydrogen-hydroxyl ion equilibrium of pure water, and the acidity-alkalinity determination measures the quantity of extracted ionic material that contributes to that equilibrium change. These tests are useful for routine acceptance testing, research work, or the evaluation and classification of different papers.

6. Apparatus

6.1 *pH meter*, a commercial pH meter including a glass electrode, reference electrode, and electronic circuitry that will measure electromotive force and indicate pH directly with a precision of 0.01 pH unit (see Fig. 1). A pH meter of Type II, III, or IV as described in Test Methods D 1293 is satisfactory, and shall be calibrated and used in accordance with Specification E 70.

6.2 *Balance*, an analytical balance sensitive to 0.1 mg.

6.3 *Hot Plate*, with temperature regulator.

NOTE 1—A steam or oil bath that can be maintained at 100°C may be substituted, if available.

6.4 *Glassware, Acid- and Alkali-Resistant:*

¹ This test method is under the jurisdiction of ASTM Committee D06 on Paper and Paper Products and is the direct responsibility of Subcommittee D06.92 on Test Methods.

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² This test method is based on the method for acidity described by S. Kohler, and G. Hall, in "Acidity in Paper," (*The Paper Industry*, Vol 7, No. 7, Edward B. Fritz, pub., October 1925, pp. 1056-1063) with some modifications developed at the National Bureau of Standards. In this revised method, one extraction is specified instead of the three extractions originally specified, because Kohler subsequently found that one extraction is sufficient for classification of paper. See "Investigation into the Determination of Acidity and Copper Number in Paper," *Meddelande 56 Statens Provningsanstalt*, Stockholm, 1932. In this article, it is stated that the acid number thus obtained is about three fourths of that obtained by three extractions.

Studies of this test method and other acidity methods are reported by B. L. Wehmhoff, in *Technical Association Papers*, Technical Association of the Pulp and Paper Industry, May 1930 and May 1931.

³ *Annual Book of ASTM Standards*, Vol 15.09.

⁴ *Annual Book of ASTM Standards*, Vol 11.01.

⁵ *Annual Book of ASTM Standards*, Vol 15.05.

⁶ Available from the Technical Association of the Pulp and Paper Industry, Technology Park, P.O. Box 105113, Atlanta, GA 30348.