



Standard Test Method for Determination of Alkalinity of Paper as Calcium Carbonate (Alkaline Reserve of Paper)¹

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1. Scope

1.1 This test method covers the determination of the alkalinity or alkaline reserve of paper, or both.

1.2 A qualitative test is described that indicates the presence of carbonate. (The detection limit is approximately 5 % calcium carbonate.)

1.3 A qualitative test is described that determines the alkalinity expressed as percent calcium carbonate or alkaline reserve, or both, expressed as moles per kilogram of paper.

NOTE 1—A similar procedure for measuring the alkalinity or alkaline reserve or both of paper will be found in [ISO 10716](#).

1.4 *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:²

[D585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product](#)

[D644 Test Method for Moisture Content of Paper and Paperboard by Oven Drying](#)

[D1968 Terminology Relating to Paper and Paper Products](#)

2.2 ISO Standard:

[ISO 10716 Paper and Board—Determination of Alkali Reserve](#)³

2.3 TAPPI Standards:

[T 266 Determination of Sodium, Calcium, Copper, Iron, and Manganese in Pulp and Paper by Atomic Absorption Spectroscopy](#)⁴

[T 610 Preparation of Indicators and Standard Solutions](#)⁴

3. Terminology

3.1 For the meaning of terms used in this test method, consult Terminology [D1968](#), or *The Dictionary of Paper*.⁴

4. Summary of Test Method

4.1 *Qualitative Test*—The presence of carbonate is determined by immersing a sample of the paper in hydrochloric acid and observing effervescence. Any carbonate or bicarbonate salt present will produce this effect.

4.2 *Quantitative Determination of Carbonate*—The paper sample is subjected to digestion in a known quantity of standardized hydrochloric acid. Back titration with standardized sodium hydroxide is used to determine the amount of hydrochloric acid consumed in the digestion process. The subsequent calculation for alkalinity assumes that all of the alkaline material neutralized was calcium carbonate. The calculation of moles per kilogram is independent of the material providing the reserve.

5. Significance and Use

5.1 Growing concern regarding the deterioration of books and various documents in libraries and archives have led to the development of standards by standard-setting bodies for improved permanence in paper. By using alkaline sizing technology, it is possible to manufacture paper at a pH of 6.5 or above and, therefore, incorporate alkaline fillers such as calcium carbonate. Alkaline sizing in itself improves permanence by eliminating acid from the sheet normally associated with a rosin/alum sizing system. The presence of an alkaline filler gives an added measure of permanence because it has the capability of sorbing acidic gases from the environment that might otherwise cause deterioration of the paper.

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 Standard Documents Relating to Paper and Paper Products.

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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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from Technical Association of the Pulp and Paper Industry (TAPPI), 15 Technology Parkway South, Norcross, GA 30092, <http://www.tappi.org>.