



Standard Test Method for Determination of Effect of Moist Heat (50 % Relative Humidity and 90°C) on Properties of Paper and Board¹

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1. Scope

1.1 This test method covers the procedure for humidified (50 % relative humidity and 90°C) heat treatment of paper or board and the general procedure for testing the heat-treated materials. The purpose is to obtain, by an accelerated test, inferences about the aging qualities of the paper.

1.2 This test method is based on work performed on printing and writing papers but may be used with discretion for other types of papers and boards. This procedure is not intended for use with electrical insulating papers, whose testing is described in Test Methods D 202.

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 202 Test Methods for Sampling and Testing Untreated Paper Used for Electrical Insulation²
- D 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Products²
- D 685 Practice for Conditioning Paper and Paper Products for Testing³
- D 774 Test Method for Bursting Strength of Paper³
- D 776 Test Method for Determination of Effect of Dry Heat on Properties of Paper and Board³
- D 919 Test Method for Copper Number of Paper and Paperboard³
- D 2176 Test Method for Folding Endurance of Paper by the M.I.T. Tester³

2.2 TAPPI Methods:

¹ This test method is under the jurisdiction of ASTM Committee D-6 on Paper and Paper Products and is the direct responsibility of Subcommittee D06.92 on Test Methods.

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This test method is related to ISO 5630 – 1986, Paper and Board—Accelerated Aging—Part 3: Moist Heat Treatment, and TAPPI T544 pm-85, Effect of Moist Heat on Properties of Paper and Board.

² Annual Book of ASTM Standards, Vol 10.01.

³ Annual Book of ASTM Standards, Vol 15.09.

T 212 One percent sodium hydroxide solubility of wood and pulp⁴

T 231 Zero span breaking length of pulp⁵

T 403 Bursting strength of paper³

T 414 Internal tearing resistance of paper (Elmendorf-type method)³

T 425 Brightness of pulp, paper, and paperboard (Directional reflectance at 457 nm)³

T 456 Wet tensile breaking strength of paper and paperboard³

T 494 Tensile breaking properties of paper and paperboard (Using constant rate of elongation apparatus)³

T 509 Hydrogen ion concentration (pH) of paper extracts—cold extraction method³

T 511 Folding endurance of paper (MIT Tester)³

3. Summary of Test Method

3.1 Properties of paper or board are compared before and after “accelerated aging” in a humidified atmosphere at an elevated temperature, namely 90°C and 50 % relative humidity.

4. Significance and Use

4.1 Exposure of paper or board to a hostile environment, such as some types of radiation, elevated temperature, or chemical attack over a period of hours, may provide information concerning (1) the natural changes that may occur in the material over a period of years and (2) the ranking of similar papers with respect to stability.

4.2 Hostile environments that have been used include exposure to heat, to heat and moisture, to visible and ultraviolet radiation, and to sulfur dioxide or other atmospheric gases.

4.3 Properties compared before and after such exposure may include, but are not limited to, the following:

4.3.1 *Mechanical Properties*—such as folding endurance, bursting strength, tearing resistance, zero-span tensile, and tensile properties (tensile at break, elongation at break and tensile energy absorption),

⁴ Available from the Technical Association of the Pulp and Paper Industry, P.O. Box 105113, Atlanta, GA 30348.

⁵ Although there is a TAPPI procedure for zero-span breaking length of pulp (T 231), there is none for paper. Commercial instruments are available for measuring zero-span tensile strength of paper.