



Standard Test Method for Determination of Effect of Dry Heat on Properties of Paper and Board¹

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1. Scope

1.1 This test method specifies the procedure for dry 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 problems, 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 Products³
- D 685 Practice for Conditioning Paper and Paper Products for Testing³
- D 828 Test Method for Tensile Breaking Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus³
- D 829 Test Methods for Wet Tensile Breaking Strength of Paper and Paper Products³
- D 919 Test Method for Copper Number of Paper and Paperboard³

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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This test method is related to TAPPI T 453 pm-85, Effect of Dry Heat on Properties of Paper and Board, and ISO 5630/1-1982, Paper and Board—Accelerated Aging—Part 1: Dry Heat Treatment.

² *Annual Book of ASTM Standards*, Vol 10.01.

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

D 2176 Test Method for Folding Endurance of Paper by the M.I.T. Tester³

D 4714 Test Method for Determination of Effect of Moist Heat (50 % Relative Humidity and 90°C) on Properties of Paper and Board³

E 145 Test Method for Gravity-Convection and Forced-Ventilation Ovens⁴

2.2 TAPPI Methods:^{5,6}

T 212 One Percent Sodium Hydroxide Solubility of Wood and Pulp

T 423 Folding Endurance of Paper (Schopper Type Tester)

T 425 Brightness of Pulp, Paper, and Paperboard (Directional Reflectance at 457 mm)

T 509 Hydrogen Ion Concentration (pH) of Paper Extracts (Cold Extraction Method)

3. Summary of Test Method

3.1 Properties of paper or board are compared before and after “accelerated aging” in a dry atmosphere at an elevated temperature.

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 the natural changes that may occur in the material over a period of years.

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 gas.

4.3 Properties compared before and after such exposure include mechanical properties, such as folding endurance and tearing resistance, optical properties such as brightness and

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ Available from the Technical Association of the Pulp and Paper Industry, Technology Park/Atlanta, P.O. Box 105113, Atlanta, GA 30348.

⁶ Other Methods—Zero-Span Tensile Strength: Although there is a TAPPI procedure for zero-span breaking length of pulp (T 231 Zero-Span Breaking Length of Pulp), there is none for paper. Commercial instruments are available for measuring the zero-span tensile strength of paper.