



Standard Specification for File Folders for Storage of Permanent Records¹

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1. Scope

1.1 This specification covers file folders used in the storage of records and documents that are expected to have maximum, or substantial, life expectancy.

1.2 It has been shown (**1, 2, 3, 4, 5**)² that the life expectancy of paper is at least an approximate function of the pH of an aqueous extract of the paper. Three pH levels, reflecting three levels of life expectancy, are specified.

1.3 The following would be expected to contribute significantly to the life and usefulness of folders: the use of folders with controlled acidity, or of folders manufactured under neutral or alkaline conditions, especially with an alkaline filler, such as calcium carbonate, that absorbs acidic gases from the atmosphere and can neutralize acidic materials formed during aging.

1.4 This specification is based on fiber sources used in the production of paper that contains no more than 1 % lignin, for papers used in archives, libraries, and other permanent records. However, under proper conditions, (see **X1.5**), fiber sources containing more than 1 % lignin may be employed for many other end uses in paper for records that are required to have a substantial life expectancy.

1.5 As indicated in Appendix **X1.4** and **X1.5**, this specification may be used as a guide.

2. Referenced Documents

2.1 ASTM Standards:³

D585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product

D646 Test Method for Grammage of Paper and Paperboard (Mass Per Unit Area)⁴

¹ This specification 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 The boldface numbers in parentheses refer to the list of references at the end of this specification.

³ 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.

⁴ Withdrawn. The last approved version of this historical standard is referenced on www.astm.org.

D1030 Test Method for Fiber Analysis of Paper and Paperboard

D1968 Terminology Relating to Paper and Paper Products

D3424 Practice for Evaluating the Relative Lightfastness and Weatherability of Printed Matter

D4714 Test Method for Determination of Effect of Moist Heat (50 % Relative Humidity and 90°C) on Properties of Paper and Board

D4988 Test Method for Determination of Alkalinity of Paper as Calcium Carbonate (Alkaline Reserve of Paper)

D5625 Test Method for Measuring Length, Width, and Squareness of Sheeted Paper and Paper Products⁴

D5634 Guide for Selection of Permanent and Durable Offset and Book Papers

2.2 TAPPI Standards:

T 236 Kappa Number of Pulp⁵

T 400 Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, or Related Product⁵

T 401 Fiber Analysis of Paper and Paperboard⁵

T 410 Grammage of Paper and Paperboard (Weight Per Unit Area)⁵

T 411 Thickness (Caliper) of Paper and Paperboard⁵

T 412 Moisture in Paper⁵

T 414 Internal Tearing Resistance of Paper⁵

T 452 Brightness of Pulp, Paper and Paperboard (Directional Reflectance at 457 nm)⁵

T 489 Stiffness of Paper and Paperboard (Taber-type Stiffness Tester)⁵

T 509 Hydrogen Ion Concentration (pH) of Paper Extracts—Cold Extraction Method⁵

T 511 Folding Endurance of Paper (MIT Tester)⁵

T 544 Effect of Moist Heat on Properties of Paper and Board⁵

2.3 ANSI Standard:

IT9.16 American National Standard for Imaging Media—Photographic Activity Test⁶

2.4 ISO Standard:

ISO 9706 Paper for Documents—Specifications for Permanence—Normative Annex—Special instructions for determining kappa number⁶

⁵ Available from the Technical Association of the Pulp and Paper Industry, 15 Technology Parkway South, Norcross, GA 30092.

⁶ Available from The American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

3. Terminology

3.1 *Definitions*—Terms used in this Specification are defined in accordance with Terminology **D1968**.

3.1.1 *acid-sized paper, n*—paper, or paper product, that has been manufactured using a procedure or process at pH values below 7 (usually from 4.0 to 6.5) that results in paper that has resistance to water penetration.

3.1.2 *alkaline-filled paper, n*—a paper containing an alkaline filler, such as calcium carbonate, having a pH value in excess of 7 (extract pH usually in the range from 7.5 to 10.0), and containing a reserve buffering capacity that can neutralize acidic materials in the paper or acidic gases sorbed from the atmosphere.

3.1.3 *alkaline-sized paper, n*—paper or paper product that has been manufactured using a procedure or process at a pH value above 7 (usually from 7.5 to 10.0) that results in a paper that has resistance to liquid penetration.

3.1.4 *base paper, n*—the fiber network existent prior to the application of any material onto the surface of that fiber network.

3.1.4.1 *Discussion*—An example is paper, internally sized in preparation for a coating or surface size operation.

3.1.5 *folder stock, n*—a paperboard used for the manufacture of folders for filing purposes.

3.1.5.1 *Discussion*—It usually is made of wood pulp and reclaimed paperstock, although some grades are made from rope or jute stock. It may be surface sized to provide better wearing qualities. It is characterized by high values for tearing resistance, stiffness, and folding endurance.

3.1.6 *neutral sized paper, n*—paper that has been manufactured using a procedure or process at a pH value of 7 (with a normal range from 6.5 to 7.5) that results in a paper that has resistance to water penetration.

3.1.7 *tag board, n*—a paperboard used for shipping tags, file folders, printed forms, envelopes, etc.

3.1.7.1 *Discussion*—It is made from rope, jute, chemical wood pulp or mechanical wood pulp, or combinations of these. It usually has a manila color and a smooth finish. It is characterized by high values for folding endurance, bursting strength, tensile strength, tearing resistance, and water finish.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *durability, n—of paper*, the capacity of paper or paperboard to resist the effects of wear in performance situations.

3.2.1.1 *Discussion*—Durability should not be used interchangeably with permanence. For example, paper money should be durable, but maximum permanence is not essential.

3.2.2 *high-usage, adj—in paper folders*, descriptive of any grade of paper designed for use in situations involving frequent handling.

3.2.3 *life expectancy*⁷, *LE, n—for paper*, length of time a product can be expected to maintain its functional, that is, physical, chemical, appearance and so forth, characteristics when stored under prescribed conditions.

3.2.3.1 *high life expectancy, LE 100, n—for paper*, the document is expected to be usable for 100 years under prescribed conditions.

3.2.3.2 *LE designation, n—for paper records*, a rating in years for the life expectancy of paper, under prescribed conditions, primarily for records.

3.2.3.3 *maximum life expectancy, LE 1000, n—for paper*, the document is expected to be usable for 1000 years under prescribed conditions.

3.2.3.4 *medium life expectancy, LE 50, n—for paper*, the document is expected to be usable for 50 years under prescribed conditions.

3.2.3.5 *Discussion*—These terms in **3.2.3** were developed for records and records substrates. One could substitute the word “folder” for the word “document” in this situation.

3.2.4 *paper with a minimum pH value, n*—as the life expectancy of paper is an approximate function of pH, one approach to describing a permanent paper is to specify a minimum pH value, for example, 5.5. This value can be achieved with a rosin-alum sizing system.

3.2.5 *permanence, n— of paper*, the tendency to resist changes in any or all of its properties with the passage of time.

3.2.5.1 *Discussion*—It is expected that the terms maximum, high, and medium permanence eventually will be replaced with maximum, high, and medium life expectancy, or with the LE designations LE-1000, LE-100, and LE-50.

4. Significance and Use

4.1 The only completely valid way to check the life expectancy of paper, or a paper product, is to store it under the relevant conditions for its expected lifetime, perhaps several hundred years. As this is not feasible, one must rely on observations made on old materials, and on our current knowledge of factors, in terms of paper properties and paper composition, that increase life expectancy. Accelerated aging also may be used.

4.2 In this specification, requirements are given in terms of the following:

4.2.1 Physical tests to identify potential durability in service,

4.2.2 Tests related to composition of the folder that are indicative of stability,

4.2.2.1 For maximum life expectancy, the presence of an alkaline filler, such as calcium carbonate, to serve as a buffering agent,

4.2.2.2 Fiber analysis, or a certificate from the supplier concerning fiber composition, and

4.2.2.3 A test for pH, within the limits described in **7.2.4**.

4.3 Folders with neutral or alkaline pH generally are stable. However, an acid folder may have been treated with a surface size containing enough calcium carbonate to give an alkaline extract pH. An acid folder may be coated with a formulation containing calcium carbonate, although folders seldom are coated. In cases of uncertainty, the supplier should provide an affidavit concerning the extract pH of the base folder.

4.4 An optional accelerated aging procedure is described in **X1.3**.

⁷ Adapted from American National Standards Institute Committee IT9.1, approved December 1991.