
PAPER AND PAPERBOARD
Characteristics, Nomenclature,
and Significance of Tests

Third Edition



Published by the
AMERICAN SOCIETY FOR TESTING AND MATERIALS
1916 Race St., Philadelphia, Pa., 19103

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(Supersedes STP No. 60-A)

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and Significance of Tests

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July, 1963



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FOREWORD

The first edition of this monograph was published in 1944 under the editorship of the late Roger C. Griffin of Arthur D. Little, Inc., with sixteen authors. The second, published in 1951, had as its editor the late Lewis S. Reid of the Metropolitan Life Insurance Co. with nine collaborators and represented a revision of the first edition. This third edition contains much new material as well as a complete revision of virtually every section.

It is believed that it should meet with the wide acceptance of the earlier editions and maintain the aim set forth originally: "to provide an authoritative discussion of the characteristics of different types of paper, the significance of tests applied to them and to nomenclature." It is intended to serve as a source of valuable information to those who may have rather infrequent contact with the paper field or be acquainted with only a small segment of it.

Many months of work have gone into the present revision. Sections were assigned to specific individuals who then submitted their work to others for criticism and suggestions. This has naturally resulted in much correspondence and discussion and explains the delay in publication.

It is impossible to give due recognition to all who partook in this work. Sincere acknowledgment and thanks are extended to those who participated in the first two editions, to many who furnished valuable suggestions and criticisms without being engaged in the actual work of writing and revision for this edition, and to the following who actively performed these tasks:

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Obviously a monograph of this type contains errors of commission as well as of omission, and comments will be appreciated, as undoubtedly still further revisions will be published. One suggestion that was very seriously considered was the inclusion of a complete Glossary but this was decided against because of the excellent "Dictionary of Paper" published under the auspices of the American Paper & Pulp Assn. and many other available glossaries dealing with various phases of the paper, paperboard, container, and graphic arts industries.

WILLIAM R. WILLETS, *Editor*
Titanium Pigment Corp.,
a subsidiary of the National Lead Co.

NOTE.—The Society is not responsible, as a body, for the statements and opinions advanced in this publication.

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LIST OF ASTM AND TAPPI METHODS OF TESTING PAPER

The following alphabetical list gives the subject matter and serial designations of the methods of testing paper and paperboard issued by the American Society for Testing and Materials and by the Technical Association of the Pulp and Paper Industry.

The ASTM methods are published in the 1961 Book of ASTM Standards, Part 6, and the 1962 and 1963 Supplements thereto; and are also issued in a special compilation of *ASTM Standards on Paper and Paper Products and Packaging*, 1961.

The TAPPI methods are published originally in *Tappi*. They are also issued in loose leaf form by the Technical Association of the Pulp and Paper Industry, 360 Lexington Avenue, New York 17, New York.

Subject	ASTM Methods	TAPPI Methods
Abrasion Loss of Paper and Paperboard	...	T 476 m
Absorbent Laminating, for Electrical Insulation	D 1080	...
Absorption by Bibulous Papers of Water and Writing Ink	D 824	T 432 m
Acid-Soluble Iron in Paper	...	T 434 m
Acidity or Alkalinity, Water-Soluble, Test for	D 548	T 428 m
Adhesiveness of Gummed Tape	D 773	T 463 m
Adhesiveness of Seals and Closures for Packages	...	T 806 sm
Adhesives for Sealing Top Flaps of Fiberboard Specimens, Bonding Permanency Test	D 1713	...
Arsenic	...	T 436 m
Ash Content	D 586	T 413 m
Bacteriological Examination of Paper and Paperboard	...	T 449 m
Basis Weight	D 646	T 410 os
Bending Quality	...	T 474 m
Bleeding Resistance of Asphalted Papers at Elevated Temperatures	D 917	T 475 m
Blocking Point of Paraffin Wax	D 1465	T 652 os
Blocking Resistance	D 918	T 477 m
Blood Resistance of Butchers' Wrapping Paper	...	T 486 sm
Blue Light (Brightness), 45-deg, 0-deg Directional Reflection	D 985	T 452 m
Bulking Thickness	D 527	T 426 m
Bursting Strength	D 774	T 403 m
Cadmium and Zinc	D 1224	...
Casein, Qualitative	D 587	T 415 m
Cellulose, Alpha-, Beta-, and Gamma-	D 588	T 429 m
Chloride Content	D 1161	...
Color	...	T 442 m
Color by Munsell System	D 1535	...
Compression Resistance (Ring Crush Test)	D 1164	T 472 m
Compression Testing of Shipping Containers	D 642	T 804 m
Conbur Test of Fiberboard Shipping Containers	...	T 801 sm
Conditioning and Testing Materials, Standard Atmospheres for	E 171	...
Conditioning and Weathering	E 41	...
Conditioning for Testing	D 685	T 402 m
Conditioning of Paperboard, Fiberboard, and Paperboard Containers for Testing	D 641	T 402 m
Copper Number	D 919	T 430 m
Corrugated Paperboard, Flat Crush	D 1225	...
Corrugated Paperboard, Static Bending Test	D 1098	...

Subject	ASTM Methods	TAPPI Methods
Crease Retention of Wrapping Paper	D 920	T 446 m
Creasing Paper for Permeability Test	D 1027	T 465 sm
Curl and Sizing	D 826	T 466 m
Dirt	...	T 437 m
Drop Test for Bags	D 959	...
Drop Test for Cylindrical Shipping Containers	D 997	...
Drop Test for Shipping Containers	D 775	T 802 m
Drum Test for Shipping Containers	D 782	T 800 m
Edge Tearing Strength	D 827	T 470 m
Erasing Quality	...	T 478 sm
Fiber Analysis	D 1030	T 401 m
Fiber Orientation and Squareness	...	T 481 sm
Filter Paper for Use in Chemical Analysis	D 1100	...
Filter Papers Analytical	D 981	T 471 m
Flammability of Treated Paper and Paperboard	D 777	T 461 m
Flexural Resistance and Deflection of Fiberboard	...	T 469 sm
Bookbinding	...	T 423 m
Folding Endurance	D 643	T 423 m
*Folding Endurance, Effect of Heating on	D 776	T 453 m
Fungus Resistance	D 2020	T 487 m
Gloss, Contrast, at 57.5 deg.	D 1222	T 424 m
Gloss, Specular, at 75 deg.	D 1223	T 480 m
Gloss, Specular, of Waxed Paper at 20 deg.	D 1834	T 653 ts
Grease Resistance (Turpentine Test)	D 722	T 454 m
Humidity, Relative, Method for Determining	E 337	...
Hydrated Lime for Cooking of Rags in Paper Manufacture	C 45	...
Hydrogen Ion Concentration (pH) of Paper Extracts	D 778	T 453 m
Identification, Microscopical, of Fillers	...	T 488 sm
Identification of Specks and Spots	...	T 445 sm
Impact Resistance of Fiberboard Shipping Containers	D 880	T 801 sm
Ink Absorption of Blotting Paper	...	T 431 m
Ink-Erasing Quality	...	T 478 sm
Insect Resistance	...	T 473 m
Interlaboratory Evaluation of Test Methods	D 1749	T 1200 ts
Kerosine Number of Roofing and Flooring Felt	D 727	T 427 m
Large Shipping Cases and Crates	D 1083	...
Lint of Paper Towels	D 1163	...
Machine Direction	D 528	T 409 os
Magnesium Oxide Standard for Spectral Reflectivity	D 986	T 633 m
Mildew (Fungus) Resistance	D 2020	T 487 m
Mineral Coating (Quantitative Determination)	D 687	T 407 m
Mineral Filler and Mineral Coating (Qualitative)	D 686	T 421 os
Mineral Filler (Qualitative Analysis)	D 686	T 421 m
Moisture	D 644	T 412 m
Moisture by Toluene Distillation	...	T 484 m
Nitrogen, Organic	D 982	T 418 os
Odor of Packaging Materials	...	T 483 sm
Opacity	D 589	T 425 m

* The TAPPI and ASTM methods for this test are the same but the former bears the title "Heat Test for Relative Stability of Paper."

Subject	ASTM Methods	TAPPI Methods
Package Cushioning Materials, Dynamic Properties.	D 1596	...
Package Cushioning Materials, Testing.	D 1372	...
Paraffin.	D 590	T 405 m
Paraffin Wax Absorptiveness.	D 983	T 630 m
Peeling Resistance.	D 1029	...
Penetration of Liquids.	D 998	...
Pentosans.	D 688	T 450 m
pH of Aqueous Solutions, Determination of.	E 70	...
Pinholes in Glassine and Greaseproof Papers.	D 1221	T 485 m
Ply Adhesion.	D 825	...
Ply Separation of Combined Container Board.	D 1028	...
Printing Ink Permeation (Castor Oil Test).	D 780	T 462 m
Proteinaceous Nitrogenous Materials (Qualitative).	...	T 417 m
Puncture and Stiffness Test.	D 781	T 803 m
Reflectance, 45-deg, 0-deg Directional for Blue Light (Brightness).	D 985	T 452 m
Reflectance, 45-deg, 0-deg Directional of Opaque Specimens by Filter Photometry.	E 97	...
Reflectance to Passage of Air.	D 726	T 460 m
Reflectivity, Spectral.	...	T 442 m
Rigidity, Stiffness, and Softness.	...	T 451 m
Ring Crush of Paperboard.	D 1164	T 472 m
Rosin.	D 549	T 408 os
Sampling.	D 585	T 400 m
Saturating Properties of Roofing Felt.	D 727	T 427 m
Shipping Containers, Definitions of Terms.	D 996	...
Silver Tarnishing.	...	T 444 m
Smoothness of Paper Under 3 psi Clamping Pressure.	...	T 490 m
Smoothness of Printing Paper.	...	T 479 sm
Staining of Paper by Alkali.	D 723	T 440 m
Starch.	D 591	T 419 m
Stiffness.	...	T 489 m
Stretch.	D 987	T 457 m
Sulfur, Reducible.	D 984	T 406 m
Surface Strength.	...	T 459 m
Surface Wettability.	D 724	T 458 m
Tearing Resistance, Internal.	D 689	T 414 m
Tensile Breaking Strength.	D 828	T 404 os
Tensile Breaking Strength (Wet).	D 829	T 456 m
Thermal Conductivity of Structural Insulating Board.	...	T 1000 m
Thermosetting Materials, Laminated.	D 709	...
Thickness.	D 645	T 411 m
Thickness of Solid Electrical Insulation.	D 374	...
Titanium Dioxide.	D 921	T 439 m
Untreated, for Electrical Insulation.	D 202	...
Vibration Test for Shipping Containers.	D 999	...
Vulcanized Fibre for Electrical Insulation.	D 619	...
Vulcanized Fibre Sheets, Rods, and Tubes Used for Electrical Insulation.	D 710	...
Water Absorption of Bibulous Paper.	D 824	T 432 m
Water Absorptiveness of Nonbibulous Paper and Paperboard.	...	T 441 m
Water Absorptiveness of Paperboard.	...	T 492 sm
Water Immersion of Paperboard.	...	T 491 sm
Water Resistance (Dry-Indicator Method).	D 779	T 433 m
Water Resistance of Containers by Spray Method.	D 951	T 805 m
Water-Soluble Matter.	D 1162	...
Water-Soluble Sulfates.	D 1099	T 468 m

ASTM AND TAPPI METHODS

Subject	ASTM Methods	TAPPI Methods
Water Vapor Permeability of Packages.....	D 895
Water Vapor Permeability of Sheet Materials at 0 F.	T 482 m
Water Vapor Permeability of Sheet Materials at High Temperature and Humidity.....	E 96	T 464 m
Water Vapor Permeability of Shipping Containers..	D 1008
Water Vapor Transmission.....	E 96	T 448 m T 464 m
Waterproof, for Curing Concrete.....	C 171
Wet Curl.....	D 826	T 466 m
Wire and Felt Sides.....	D 725	T 455 m
Zinc and Cadmium.....	D 1224
Zinc Pigments.....	T 438 m