



Standard Test Methods for Sampling and Testing Untreated Paper Used for Electrical Insulation¹

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This standard has been approved for use by agencies of the Department of Defense.

^{ε1} NOTE—Editorial changes made to footnotes 13-15, and Section 1 September 2002.

1. Scope

1.1 These test methods cover procedures for sampling and testing untreated paper to be used as an electrical insulator or as a constituent of a composite material used for electrical insulating purposes.

1.1.1 Untreated papers are thin, fibrous sheets normally laid down from a water suspension of pulped fibers (usually cellulosic), which may contain various amounts of nonfibrous ingredients, and which are calendared, if required, to obtain desired thickness and density. Nevertheless, these test methods are applicable, generally although not invariably, to papers formed by other means, to papers modified (during or after formation) by additions, and to papers given subsequent mechanical treatments such as creping.

1.1.2 As an electrical insulating and dielectric material, paper is considered “untreated” until it is subjected to a manufacturing process such as drying, impregnation, or varnish treatment.

1.1.3 The test methods given herein were developed specifically for papers having a thickness of 0.75 mm (0.030 in.) or less. A number of these test methods are also suitable for use on other materials such as pulps or boards. Refer to Test Methods D 3376 or Methods D 3394 to determine which tests are applicable to pulps or electrical insulating boards. In the paper industry, some products in thicknesses of less than 0.75 mm are termed “paperboard”. Such products are included within the scope of these methods.

1.1.4 These test methods are applicable to flexible fibrous-mat materials formed from suspensions of fiber in fluids other than water. These mats may have thicknesses approaching 2 mm, and may contain fibers that are natural,

synthetic, organic, or inorganic; fillers that are natural, synthetic, organic, or inorganic; and flexible polymeric binder materials.

1.2 The procedures appear in the following sections:

Procedure	Sections	ASTM or TAPPI Reference (Modified)
Absorption (Rise of Water)	78 to 83	...
Acidity-Alkalinity-pH	45 to 54	E 70
Air Resistance	98 to 101	D 726
Aqueous Extract Conductivity	55 to 64	...
Ash Content	40 to 44	D 586
Bursting Strength	102 to 107	D 774
Chlorides (Water-Extractable)	165 to 183	...
Conditioning	15	D 6054
Conducting Paths	138 to 151	...
Density, Apparent	29 to 33	...
Dielectric Strength	152 to 157	D 149
Dimensions of Sheet, Rolls and Cores	16 to 24	D 374
Dissipation Factor and Permittivity	158 to 164	D 150
Edge-Tearing Resistance	126 to 130	D 827
Fiber Analysis	74 to 77	D 1030
Folding Endurance	108 to 110	T 423 and D2176
Grammage	25 to 28	D 646
Permittivity	158 to 164	D 150
Heat Stability in Air	131 to 137	D 827
Impregnation Time	84 to 91	...
Internal-Tearing Resistance	121 to 125	D 689 or T414
Moisture Content	34 to 39	D 644 and D3277
Particulate Copper	193 to 202	...
Particulate Iron	184 to 192	...
Reagents	4	D 1193
Reports	14	E 29
Sampling	6 to 13	D 3636
Silver Tarnishing by Paper and Paperboard	203 to 206	T 444
Solvent-Soluble Matter	65 to 73	...
Surface Friction	92 to 97	D 528 and T455
Tensile Properties	111 to 120	D 76, E4
Thickness (see Dimensions)	16 to 24	D 374

1.3 The tests for Holes and Felt Hair Inclusions and the Stain Test for Fine Pores, have been removed from this compilation of test methods. These test methods were specific to grades of capacitor paper formerly covered by Specification D 1930, which has been withdrawn.

¹ These test methods are under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and are the direct responsibility of Subcommittee D09.19 on Dielectric Sheet and Roll Products.

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