



Standard Test Method for Blocking Resistance of Paper and Paperboard¹

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1. Scope

1.1 This test method covers the determination of the blocking resistance of flexible types of packaging materials, including paper, and the impregnated, coated or laminated, or coated and laminated, combinations of paper with metallic foils and synthetic films that may be produced therefrom, but is applicable to papers in general, whenever a tendency to block is important. The test method provides a range of standard conditions of temperature and relative humidity at constant pressure for a specified time which is designed to simulate varying climatic conditions that may be encountered in the manufacture, storage, transportation, or use of the materials.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information only.

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:²

D 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Products

D 685 Practice for Conditioning Paper and Paper Products for Testing

D 1968 Terminology Relating to Paper and Paper Products

3. Terminology

3.1 *Definitions:* Definitions shall be in accordance with Terminology D 1968 and the Dictionary of Paper.³

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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² 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.

³ Available from the Technical Association of the Pulp and Paper Industry, Box 105113, Atlanta, GA 30348.

4. Apparatus

4.1 *Oven*—A constant-temperature oven that can be maintained at selected temperatures between 100 and 140°F (38 and 67°C) within $\pm 2^\circ\text{F}$ (1°C).

4.2 *Desiccator*—A desiccator, for use as humidity chamber, having a minimum diameter of 6 in. (152 mm). Ground-glass edges should be perfect, clean, and freshly lubricated with stopcock grease. A vacuum type is preferred with pressure-relieving stopcock in the cover.

4.3 *Bedplates*—Four 4 by 4-in. (102 by 102 mm) pieces of plate glass or corrosion-resistant metal having flat upper surfaces.

4.4 *Pressure Blocks*—Four blocks having permanently plane rectangular bottom surfaces 1.25 by 1.75 in. (32 by 44 mm). Each pressure block shall weigh, or be loaded to weigh, 17.5 ± 0.2 oz (496 ± 6 g) to yield a pressure of 0.5 psi (3.4 kPa) on the underlying specimens. A brass block in the form of a rectangular parallelepiped 1.25 in. in width by 1.75 in. in length by 1.625 in. (41.27 mm) in height will meet the requirements without loading.

4.5 *Interleaving Material*—Interleaving material of white bond paper or metal foil.

5. Sampling

5.1 The material shall be sampled in accordance with Practice D 585.

6. Test Specimens

6.1 Eight test specimens 1.25 by 1.75 in. (32 by 44 mm) shall be cut from each sample for each set of test conditions used. The specimens shall be cut from the sample in such a way as to be representative.

7. Conditioning

7.1 The specimens shall be conditioned before testing in accordance with Practice D 685.

8. Test Conditions

8.1 One or more of the sets of conditions given in Table 1 shall be used. Selection of the proper conditions will depend upon the type of material tested and the actual conditions that



TABLE 1 Test Conditions

Dry-Bulb Temperature, ° F (°C)	Relative Humidity, %	Pressure, psi (kPa)
100 ± 2 (38 ± 1)	75	0.5 (3.4)
120 ± 2 (49 ± 1)	75	0.5 (3.4)
140 ± 2 (60 ± 1)	75	0.5 (3.4)
100 ± 2 (38 ± 1)	44	0.5 (3.4)
120 ± 2 (49 ± 1)	44	0.5 (3.4)
140 ± 2 (60 ± 1)	44	0.5 (3.4)

are liable to arise during storage and use of the material. In any case, the temperature selected shall be below the softening point of the coating.

NOTE 1—If the test temperature used is higher than the softening point of the coating, material such as wax may soak into the base sheet and thus give no adhesion.

8.2 The desired relative humidity shall be obtained by using a saturated salt solution of the proper salt in distilled water in the presence of an excess of the solid phase. The solution shall be placed in the base of the desiccator for this test, using cp sodium chloride to obtain approximately 75 % relative humidity and cp potassium carbonate to obtain approximately 44 % relative humidity.

9. Procedure

9.1 Bring the apparatus, including the desiccator containing the proper salt solution, and the pressure surfaces after assembly, to the test temperature by heating it for at least 1 h in the test oven which previously has been adjusted to the desired temperature. When the desiccator is warmed, momentarily open its lid or open the cover stopcock to equalize pressure for a few minutes and then close the lid until the specimens are ready for insertion.

9.2 Stack the conditioned test specimens and pressure media on the shelf of the desiccator in the following sequence:

Bottom plate 4 by 4 in. (102 by 102 mm),
Interleaving paper or foil,
Four test specimens,
Interleaving paper or foil,
Four test specimens, and
Pressure block.

Stack specimens having faces of different characters so that the three possible surface combinations—face to face, face to back, and back to back—are tested. In this case, stack the two sets of four test specimens in the following sequence:

Interleaving paper or foil,
One specimen, face up (face to face),
One specimen, face down (face to face),

One specimen, face down (face to back),
One specimen, face up (back to back),
Interleaving paper or foil, and
Pressure block.

A desiccator 6 in. (152 mm) in diameter will permit four samples to be tested in duplicate at one time. Locate each stack in a quarter section of the bottom plate so that individual stacks do not overlap and so that the test areas are completely supported by the bottom plate.

9.3 Place the desiccator containing the assembled test stacks in the oven. Let the lid of the desiccator remain partially open or leave stopcock open to relieve pressure for 15 min; then close. Leave the desiccator in the oven at the desired temperature for 21 ± 1 h.

9.4 Take the desiccator from the oven, carefully remove the pressure blocks from the test stacks, and remove each stack from the desiccator. Gently lay down the stacks of test specimens in the room (preferably at 73°F (23°C) and 50 % relative humidity) and let stand for 30 min. Examine by slipping or peeling the sheets apart, and rate the specimens for blocking resistance as follows:

Degree of Blocking Resistance	Description of Blocking
No blocking	No adhesion or cohesion between contiguous surfaces which slide freely upon one another. Surfaces of specimens are not marred when sheets are separated.
Slight blocking	Slight adhesion. Adjacent surfaces do not slide freely, and upon separation of the sheets the surfaces show an occasional evidence of slight marring.
Considerable blocking	Adhesion or cohesion of contiguous surfaces. Layers may be separated with difficulty. Surfaces will be definitely marred or partially destroyed upon separation.

10. Report

10.1 The report shall include the following:

10.1.1 Name and type of material,

10.1.2 Test conditions used—temperature, relative humidity, and pressure, and

10.1.3 Degree of blocking resistance, including a brief description of blocking found. If dissimilar surfaces exist on the test specimen, report the blocking of the three possible surface combinations.

11. Precision and Bias

11.1 A precision statement is not appropriate for this test method since the test is comparative in nature and the results are subjective and not numerical.

12. Keywords

12.1 blocking; blocking resistance; packaging papers; paper; paperboard



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