



Designation: D4946 – 89 (Reapproved 2017)

Standard Test Method for Blocking Resistance of Architectural Paints¹

This standard is issued under the fixed designation D4946; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers an accelerated procedure for evaluating the face-to-face blocking resistance of trades sales paints. This is not to be confused with blocking resistance Test Method D3003, which is concerned with blocking of industrial coatings on metal substrates, nor with Test Method D2793 which is concerned specifically with wood product finishes and reports results on a satisfactory or not satisfactory basis, rather than by the degree of blocking tendency as in this test method.

1.2 The values stated in the SI units of measurement are to be regarded as the standard. The values given 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

D16 Terminology for Paint, Related Coatings, Materials, and Applications

D2793 Test Method for Block Resistance of Organic Coatings on Wood Panel Substrates

D3003 Test Method for Pressure Mottling and Blocking Resistance of Organic Coatings on Metal Substrates

3. Terminology

3.1 *Definitions:*

3.1.1 *blocking, n*—the undesirable sticking together of two painted surfaces when pressed together or placed in contact with each other for an extended period of time, as referenced in Terminology D16.

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.42 on Architectural Coatings.

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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.

4. Summary of Test Method

4.1 Dried paint films are placed face-to-face and a pressure of about 127 g/cm² (1.8 psi) is applied. These paint films are put into an oven for 30 min to make the test more stringent. After cooling, the blocked panels are peeled apart. The degree of blocking is rated subjectively for tack or seal using a series of standard descriptive terms corresponding to numerical ASTM values of 10 to 0.

5. Significance and Use

5.1 Dry paint often comes in contact with itself especially in window and door areas and, depending on its hardness, the pressure, temperature, humidity, and duration of time the surfaces are in contact, sometimes sticks to itself (blocks). This stringent test method can be used to compare and rate subjectively the resistance of paints to blocking.

6. Apparatus

6.1 *Conditioned Room*, at 18 to 29.5°C (65 to 85°F) and 40 to 60 % relative humidity.

6.2 *Sealed Paper Test Charts*, approximately 190 by 280 mm (7.5 by 11 in.).

6.3 *Applicator Blade*, 13 to 15 cm (5 to 6 in.) wide, 0.15-mm (6-mil) clearance.

6.4 *Oven*, 48 to 52°C (115 to 125°F).

6.5 *Rubber Stoppers*, No. 8, 3.2 cm (1.25 in.) smaller diameter.

6.6 *Weights*, 1000 g.

6.7 *Scissors*.

6.8 *Aluminum Tray or Pan*, flat.

7. Procedure

7.1 Cast the paint to be tested on a sealed test chart using the applicator blade. Condition coated panels in the conditioned room for seven days. All painted panels should be kept free of grease, oil, or fingerprints since these will affect block resistance.

7.2 After the panels have been conditioned, cut out six 3.8 by 3.8-cm (1½ by 1½-in.) sections from the painted chart. Start the cut at least 1.3 cm (½ in.) away from the edge of the drawdown.

7.3 Place the cut sections with the paint surfaces face-to-face for each paint to be tested.

7.4 The weights, stoppers, and tray should be temperature equilibrated in the oven prior to running the test.

7.5 Place the face-to-face specimens in the oven on a flat aluminum tray. Place a No. 8 stopper on top, with the small diameter in contact with the specimens, then place a 1000-g weight on top of the stopper. This results in a pressure of 127 g/cm² (1.8 psi) on the specimens. One weight and stopper is to be used for each specimen to be tested. It is recommended that “pass” and “fail” paint controls be used in each test run and that the tests be run in triplicate.

7.6 After exactly 30 min, take the stoppers and weights off the test specimens and remove them from the oven. Allow them to cool for ½ h in the conditioned room before determining the block resistance.

7.7 After cooling, separate the specimens by peeling them apart with a slow and steady force at about 180° from each other forming a “T” pattern during beginning of the separation. It is necessary to put the specimen next to the ear while separating to actually hear the degree of tack. Rate for blocking resistance on a scale of 0 to 10 (see 8.2).

8. Interpretation of Results

8.1 Blocking resistance is rated on a scale of 10 to 0, which corresponds to a subjective tack (sound of separation when peeled) or seal (the complete sticking together) rating determined by the operator. This rating system is defined in 8.2 in the appropriate descriptive terms. The degree of seal is the estimated area on the specimens where the paint surfaces adhere and some of the paper tears away from the chart when peeled.

8.2 Blocking Resistance Ratings:

Blocking Resistance Numerical Ratings	Type of Separation	Performance
10	no tack	perfect
9	trace tack	excellent
8	very slight tack	very good
7	very slight to slight tack	good to very good
6	slight tack	good
5	moderate tack	fair
4	very tacky; no seal	poor to fair
3	5 to 25 % seal	poor
2	25 to 50 % seal	poor
1	50 to 75 % seal	very poor
0	75 to 100 % seal	very poor

9. Report

9.1 Report the blocking resistance rating determined in accordance with 8.2.

10. Precision

10.1 Data are unavailable for a conventional precision statement. However, based on actual laboratory experience, with experienced operators, the repeatability is estimated to be plus or minus one blocking resistance unit. Numerical values may differ from operator to operator but relative ranking should be about the same. As in many tests the precision improves with practice.

11. Keywords

11.1 blocking; blocking resistance; sticking; tack

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