



Designation: D7088 – 17

Standard Practice for Resistance to Hydrostatic Pressure for Coatings Used in Below Grade Applications Applied to Masonry¹

This standard is issued under the fixed designation D7088; 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 practice is for the evaluation of coatings used in below grade applications to resist the passage of water through concrete block.

1.2 The values stated in SI units 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 to determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D714 Test Method for Evaluating Degree of Blistering of Paints](#)

[D1475 Test Method For Density of Liquid Coatings, Inks, and Related Products](#)

[D3924 Specification for Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials \(Withdrawn 2016\)](#)³

[D3925 Practice for Sampling Liquid Paints and Related Pigmented Coatings](#)

¹ This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.47 on Concrete, Stone and Masonry Treatments.

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

2.2 *U. S. Federal Standards*

[TT-P-1411A Paint, Copolymer-Resin, Cementitious \(for Waterproofing Concrete and Masonry Walls\)](#)⁴

3. Summary of Practice

3.1 Commercially available concrete blocks or concrete masonry units, typically 20 by 20 by 20 cm (8 by 8 by 8 in.) in outside dimensions with a hollow inside area (cell) of a nominal 10 by 13 by 20 cm (4 by 5 by 8 in.) with a nominal wall thickness of 4 cm (1½ in.) are coated on all four faces with the test paint and allowed to cure. Rubber gaskets are sealed to the top and bottom of the test blocks typically with an epoxy or sealant. Water is then used to fill each coated test block. They are allowed to sit for seven days. Air pressure is then introduced and the face of the blocks is evaluated for the size and frequency of water droplets on the face of the coating, any blistering, loss of adhesion, softening, discoloration or other film irregularities.

4. Significance and Use

4.1 This test is meant to simulate the ability of a coating applied to a basement or other below grade masonry walls to prevent the intrusion of water through the coating caused by hydrostatic pressure from water on the outside of the structure.

5. Apparatus

5.1 The metal frame test apparatus used in this practice (See [Fig. 1](#)) consists of a series of bolts and wing nuts used for clamping the plate tightly against the gasket and the test block. The top metal plate has an opening in the center into which a pipe cap is drilled and tapped to receive an air supply from a compressor tank or hand pump to increase in inside pressure. (See [Fig. 2](#).)

5.2 The test apparatus typically consists of the following:

5.2.1 *Galvanized Steel Top and Bottom Plates*, measuring 28 by 28 by 0.3 cm (11 by 11 by ¼ in.), each with ¼ in. holes drilled along the outer edges of the plates for insertion of screws and bolts to secure the blocks. There are typically three

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

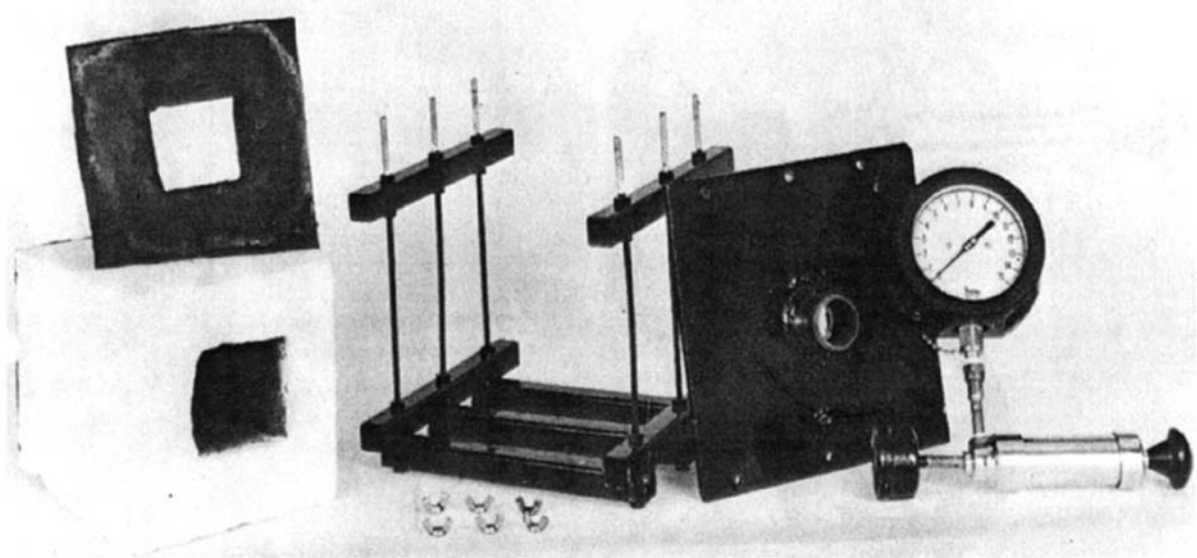


FIG. 1 Metal Frame Test Apparatus

5.2.2 *Bolts (8)*, 12 by ¼ in. with accompanying washers and wing nut screws to secure each block.

5.2.3 *Air Compressor*, capable of pressurizing the test blocks to approximately 4 pounds per square inch (psi) equipped with a pressure regulator to control the air pressure being applied to the block.

5.2.4 *Rubber Gaskets (2)*, 20 by 20 by 0.5 cm (8 by 8 by ¼ in.) to be placed on top and bottom of the test block. The gaskets to be used for the top of the block should have an opening to assure that air pressure can be applied.

6. Reagents and Materials

6.1 *Concrete Masonry Units (3)*, 20 by 20 by 20 cm (8 by 8 by 8 in.) blocks with hollow cores with an inside openings (cell) typically 10 by 13 by 20 cm (4 by 5 by 8 in.) in size and walls approximately 4 cm (1½ in.) thick. These blocks are typical of the masonry units used in construction and may be obtained from commercial masonry supply companies.

6.2 *Stiff Bristle Brush*, for cleaning test substrates.

6.3 *Paint Brush*, polyester nylon for applying test coatings.

6.4 *Rubber Gasket*, (¼ in. thick) used to ensure a tight seal on the top and bottom of the coated block.

6.5 *Sealant, Epoxy or Other Adhesive*, to ensure a tight seal of the gasket to the block.

6.6 *Food Dyes*.

7. Sampling

7.1 Sampling of the coating shall be conducted in accordance with procedures outlined in Practice [D3925](#).

8. Procedure

8.1 Presoak test blocks in tap water overnight. Scrub off any remaining dirt and then thoroughly dry in an oven and store at standard conditions as outlined in Specification [D3924](#) until testing.

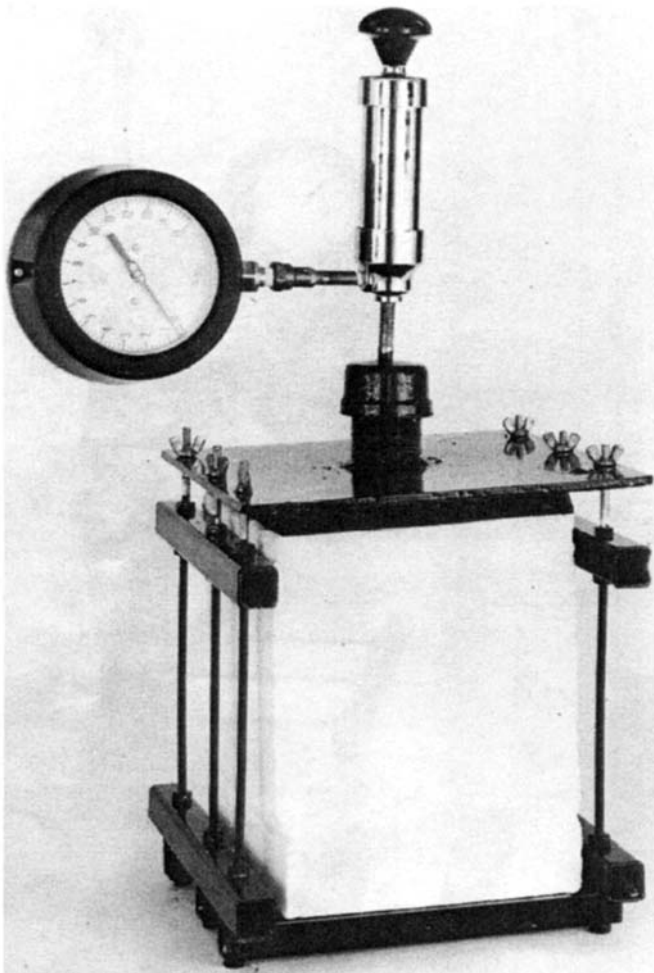


FIG. 2 Test Apparatus

holes on each side. In addition, the top plate should have a 2.5 cm (1 in.) diameter hole in the center for insertion of the air supply.

NOTE 1—Any cut edges, if present, should be sealed using an epoxy coating or similar sealer and not coated with the test paint. The test blocks may be available with two or three cores. The blocks are then cut to produce two or three separate blocks. Where the blocks are cut are the cut edges.

8.2 Using a stiff bristle brush, brush off any loose material on the surface of the blocks followed by spraying with compressed air to ensure the removal of all loose concrete.

8.3 Place blocks on corks or a stand to ensure that the top and the bottom of the blocks are not coated.

8.4 Determine the density of the paint in accordance with procedures outlined in Test Method **D1475** and apply the paint to each block using a good quality nylon/polyester brush at the coverage rate specified by the manufacturer, or at a coverage rate of 75 square feet per gallon using the following equation:

$$\text{Grams of Paint Needed} = \frac{454 \times \text{Density (lb/gal)} \times \text{Area (in sq. in.)}}{144 \times \text{Coverage Rate (sq. ft/gal)}} \quad (1)$$

8.5 Allow blocks to dry overnight. Apply a second coat of the test paint to each block using a good quality nylon/polyester brush at a coverage rate in accordance with manufacturer's instructions, or at a coverage rate of approximately 75 square feet per gallon. Allow the coated blocks to dry for seven days at standard conditions or in accordance with manufacturer's instructions.

8.6 Place rubber gaskets to the top and bottom of the coated blocks. Seal the gaskets using a sealant, epoxy or other adhesive to ensure a tight seal of the gasket to the block.

8.7 Fill the inside of the sealed test block with tap water up to the top of each inside hollow core and supply water as needed to keep them filled for seven days.

NOTE 2—It is common to use water to which food dye has been added. Using food dye enables the observer to more easily see water droplets that may come through the typically white test coating.

8.8 Screw on the cap, clamp the top and bottom metal plates tightly, check for leaks on edges, around the gaskets and examine the paint film for any irregularities. Record any observations.

8.9 Apply 4 psi of air pressure by suitable means, such as an air compressor or manual pump, and maintain for ½ h, or for a time as agreed upon between purchaser and supplier. Release

air pressure after ½ h. Leave the test apparatus intact for 24 h and then apply 4 psi again for an additional ½ h. Release air pressure and evaluate the face of the test blocks for both the size and density of water droplets on the face of the blocks or the presence of blistering. Use Test Method **D714** as a guide to describe the size and density of water droplets on the face of the blocks. Leave the test apparatus intact for an additional 24 h.

8.10 After 24 h, evaluate the coating for any loss of adhesion or softening of the coating by scraping the face of the block with a wooden tongue depressor or any other suitable device. Evaluate for any other film irregularities and record findings.

NOTE 3—An alternate method of maintaining 4 psi of pressure on the test blocks, when an air compressor or manual pump is not available, is to attach a 8 ft length of clear plastic tubing to the top of the test block. Next attach a quart plastic container to the other end of the tubing and place the container approximately 8 ft above the test block. Fill the container and tubing with water ensuring that no air bubbles are noted. Attach a clamp at the base of the tubing to discontinue pressure when needed.

9. Interpretation of Results

The pass/fail criteria will be as agreed upon between manufacturer and user.

NOTE 4—Federal Specification TT-P-1411A,⁵ from which this practice is derived, required that after testing, the film should show no blistering, loss of adhesion, softening, discoloration or any other film defects. If beads of water droplets appear on the face of the coated test blocks, they shall not be larger than size 6 and frequency M (Medium) as shown in Test Method **D714**.

10. Report

10.1 Test paint used, application rate and curing conditions.

10.2 Amount of air pressure applied and time blocks were maintained at that pressure, if other than specified.

10.3 Any blistering, softening, loss of adhesion and the size and frequency of any water droplets on the outside face of the coated test block after testing.

10.4 Any deviations from the above practice.

11. Keywords

11.1 coatings-masonry; resistance to hydrostatic pressure

⁵ Cancelled December 1, 1994.

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