



Designation: D7870/D7870M – 13

Standard Practice for Moisture Conditioning Compacted Asphalt Mixture Specimens by Using Hydrostatic Pore Pressure¹

This standard is issued under the fixed designation D7870/D7870M; 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 includes procedures for preparing compacted asphalt mixture specimens, exposing the specimens to hydrostatic pore pressure inside an enclosed chamber and guidance on testing the specimens for the effect of water on the tensile strength or change in other properties of the asphalt mixture, such as density, modulus, etc.

1.2 Specimens conditioned according to this practice can be tested using methods and test procedures referenced in this document and those results may provide information as to the effect of the moisture conditioning of this practice on the moisture sensitivity of those mixtures.

1.3 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 *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

- D979 Practice for Sampling Bituminous Paving Mixtures
- D1561 Practice for Preparation of Bituminous Mixture Test

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.22 on Effect of Water and Other Elements on Bituminous Coated Aggregates.

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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.

- Specimens by Means of California Kneading Compactor
- D2726 Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
- D3665 Practice for Random Sampling of Construction Materials
- D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
- D4013 Practice for Preparation of Test Specimens of Bituminous Mixtures by Means of Gyrotory Shear Compactor (Withdrawn 2013)³
- D4867 Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
- D5361 Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing
- D6752 Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
- D6925 Test Method for Preparation and Determination of the Relative Density of Asphalt Mix Specimens by Means of the Superpave Gyrotory Compactor
- D6926 Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
- D6927 Test Method for Marshall Stability and Flow of Asphalt Mixtures
- D6931 Test Method for Indirect Tensile (IDT) Strength of Bituminous Mixtures
- 2.2 AASHTO Standards:⁴
 - AASHTO TP 79 Standard Method of Test for Determining the Dynamic Modulus and Flow Number for Hot Mix Asphalt (HMA) Using the Asphalt Mixture Performance Tester (AMPT)

3. Significance and Use

3.1 This practice provides an accelerated conditioning method under cyclic loading. This system is capable of operating at higher than normal temperatures and creating pore pressure within a compacted asphalt mixture to achieve an

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.

acceleration of the effects that a mixture would experience over time from traffic at normal temperatures and conditions. The accelerated conditioning in this practice is intended to simulate the stresses induced in a wet pavement by a passing vehicle tire. The pulse shape produced by this system approximates a Lorentzian function with a half peak width of approximately 1 s at 276 kPa [40 psi].

3.2 The factors that influence the potential for moisture damage to occur include aggregate mineralogy, mixture air voids, water, cyclic applied stress, and elevated temperature. This practice provides a method and apparatus that is capable of producing three of these factors: water, stress, and high temperature. Aggregate mineralogy and air voids are mixture properties.

3.3 Specimens conditioned by this system can be tested using a variety of different tests including, Test Method D6931, Test Method D6927, bulk specific gravity difference obtained by Test Methods D6926 or D6752 for before and after conditioning, dynamic modulus, flow number, AASHTO TP 79 and visual inspection for stripped aggregates.

NOTE 1—The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of Practice D3666 are generally considered capable of competent and objective testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with Practice D3666 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of Practice D3666 or some

similar acceptance guideline provides a means of evaluating and controlling some of those factors.

4. Apparatus⁵

4.1 Balance in accordance with Test Method D2726.

4.2 Water bath capable of maintaining a temperature of 25 ± 1°C [77 ± 2°F].

4.3 System (similar to Fig. 1) having a specimen chamber capable of testing one or more specimens with diameters of 150 mm [6 in.] or less. The system should be capable of applying a cyclic pressure peak of approximately Lorentzian function in shape with a peak pressure within ±30 kPa [±4 psi] of the pressure set point and a width of the pressure peak at half maximum of 1 ± 0.5 s.

4.3.1 The system shall be equipped with appropriate valves for automatically purging (de-airing) and removing air from the specimen chamber and allowing replacement of the accessible air void spaces with water.

4.3.2 The specimen chamber shall be capable of withstanding pressures of up to 690 kPa [100 psi].

⁵ The sole source of supply of the apparatus known to the committee at this time is InstroTek, Inc., 5908 Triangle Drive, Raleigh, N.C. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

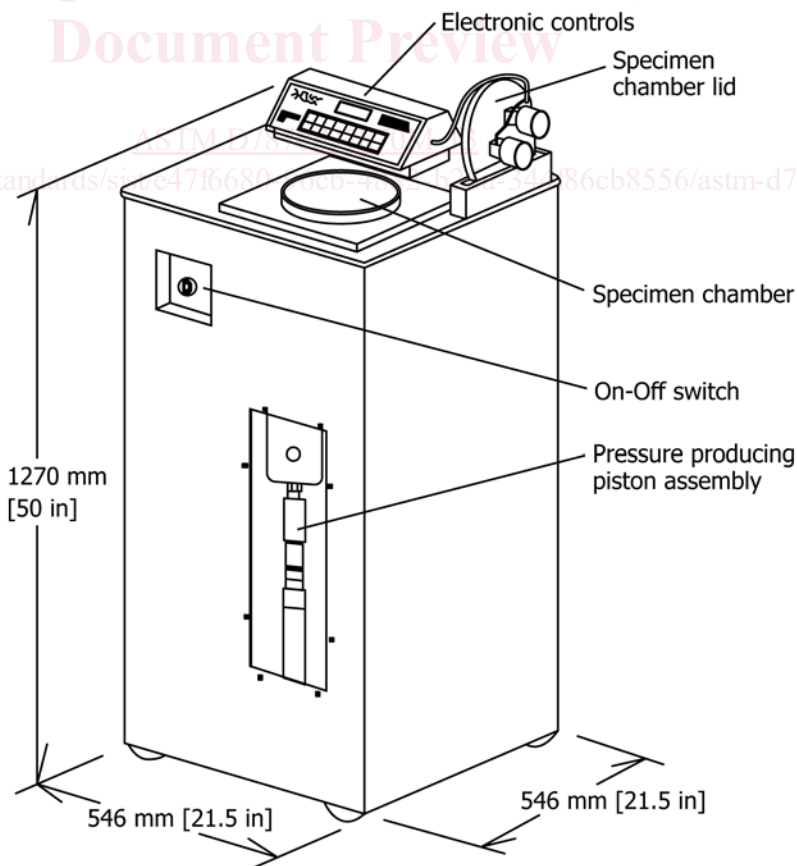


FIG. 1 Moisture Conditioning System