



# Standard Practice for Preparation of Bituminous Mixture Test Specimens by Means of California Kneading Compactor<sup>1</sup>

This standard is issued under the fixed designation D1561/D1561M; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 The practice covers the preparation of test specimens of bituminous paving mixtures by means of a mechanical compactor that imparts a kneading action to the test specimens by a series of individual impressions made with a ram.

1.2 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.

1.3 *Units*—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.

1.4 *This standard does not purport to address all of the safety problems, 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:<sup>2</sup>

[D1560 Test Methods for Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus](#)

[D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials](#)

[D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing](#)

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.20 on Mechanical Tests of Bituminous Mixtures.

Current edition approved Dec. 1, 2013. Published January 2014. Originally approved in 1958. Last previous edition approved in 2005 as D1561 – 92 (2005) <sup>$\epsilon$ 1</sup>. DOI: 10.1520/D1561\_D1561M-13.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

### 2.2 ASTM Adjuncts:

[California Kneading Compactor<sup>3</sup>](#)

## 3. Significance and Use

3.1 This practice can be used to prepare cylindrical specimens of bituminous mix for subsequent testing. The procedure incorporates the use of the California Kneading Compactor in an attempt to duplicate the kneading action that is provided by the equipment now being used for the compaction of asphalt concrete pavement.

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 Specification D3666 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of the standard are cautioned that compliance with Specification D3666 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of Specification D3666 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.

## 4. Apparatus

4.1 *California Kneading Compactor*—Mechanical kneading compactor, as shown in Fig. 1,<sup>3</sup> for consolidating test specimens.

NOTE 2—Kneading compactors, which on calibration develop a trace curve similar to that of the California kneading compactor, shall be considered acceptable under this test method. Alternatively, any kneading compactor capable of fabricating specimens that will show stabilometer values equivalent to those obtained from the California kneading compactor shall be acceptable for use under this test method. The supplier has the responsibility of furnishing those substantiating data for his device.

NOTE 3—Curves are considered within calibration when they show the same peak pressure and dwell time in load time tract obtained in the calibration procedure. The tamping foot can be raised or lowered through a maximum distance of 254 mm [10 in.]. Provision is made for individual adjustments of down stroke rate, up stroke rate, up stroke return distance and dwell in the down position.

NOTE 4—This compactor shall be considered in calibration when the peak momentary load applied to a test specimen is held within  $\pm 5\%$  of the intended foot pressure (within the range from 2.4 to 3.4 MPa [350 to 500 psi]).

<sup>3</sup> Blueprints of detailed drawings of the apparatus illustrated in Fig. 1 are available from ASTM International Headquarters. Request Adjunct No. ADJD1561. Original adjunct produced in 1960.



FIG. 1 California Kneading Compactor

NOTE 5—The stabilometer values from replicate specimens fabricated by this Practice D1561 and tested in accordance with Test Methods D1560, shall fall within a range of 3 units for all dense-graded bituminous mixtures containing aggregates not larger than 12.7 mm [ $\frac{1}{2}$  in.] and within a range of 4 units for coarser graded bituminous mixtures containing up to 25.4-mm [1-in.] maximum size aggregates.

4.2 *Compactor Foot*—A ram having a face shaped as shown in Fig. 2, and having an area of approximately 20.059 cm<sup>2</sup> [3.1 in.<sup>2</sup>].

4.3 *Compaction Mold in Kneading Compactor*, as shown in Fig. 3.

4.4 *Molds*—Molding cylinders, 101.6  $\pm$  0.13 mm [4  $\pm$  0.005 in.] in inside diameter by 127 mm [5 in.] in height. A minimum of three such compaction molds is recommended.

4.5 *Rod*—Round-nose steel rod, 9.5 mm [ $\frac{3}{8}$  in.] in diameter by 406.4 mm [16 in.] long.

4.6 *Paper Disks*—Heavy paper disks, 101.6 mm [4 in.] in diameter.

4.7 *Shim*—Steel shim, 6.4 mm [ $\frac{1}{4}$  in.] thick, 19.1 mm [ $\frac{3}{4}$  in.] wide, and 63.5 mm [2 $\frac{1}{2}$  in.] long.

4.8 *Metal Followers*—Two metal followers, 101.2 mm [3.985 in.] in diameter; one 139.7 mm [5.5 in.] high, the other 38.1 mm [1.5 in.] high.

4.9 *Testing Machine*—A compression testing machine having a minimum capacity of 22 kN [50 000 lbf].

4.10 *Ovens*—Electric ovens capable of maintaining temperatures of up to 163°C [325°F].

4.11 *Balance*—A balance having a minimum capacity of 5 kg and meeting the requirements of Specification D4753 for a balance with 0.01-g readability.