



Designation: **D 5361 – 9500**

## Standard Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing<sup>1</sup>

This standard is issued under the fixed designation D 5361; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This practice describes a procedure for removal of a sample of compacted bituminous mixture from a pavement for laboratory testing.

1.2 The values ~~given~~ stated in inch-pound SI units are to be regarded as the standard. The ~~SI units~~ 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:*

---

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee ~~D-4~~ D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.30 on Methods of Sampling.

Current edition approved ~~Feb. 15, 1995~~, Jan. 10, 2000. Published April ~~1995~~, 2000. Originally published as D 5361 – 93. Last previous edition D 5361 – 93~~5~~.

**3. Significance and Use**

3.1 Samples obtained in accordance with the procedure given in this practice may be used to measure pavement thickness, density, resilient or dynamic modulus, tensile strength, Marshall or Hveem stability, or for extraction testing, to determine asphalt content, asphalt properties and mix gradation.

**4. Apparatus**

4.1 To minimize distortion of the compacted bituminous course(s), power equipment shall be used to secure the sample. The equipment may be either a core drill or power saw.

4.2 The cutting edge of the core drill bit shall be of hardened steel or other suitable material with diamond chips embedded in the metal cutting edge.

4.3 Saw blades used in a power saw shall be either a hardened metal blade with diamond chips embedded or an abrasive blade such as carborundum or similar material.

4.4 A source of cooling water, dry ice, liquid nitrogen, or other cooling material is normally required but in some cases may be omitted when only a single sample is to be secured. At any time there is evidence of damage to the edge of the sample due to the generation of heat caused by friction, a cooling material shall be applied to the cutting tool or to the pavement surface to minimize sample distortion or other damage.

4.5 A device (core debonder) for separating core samples from underlying layers may be used. If such device is employed, it shall be a metal semicircle with an inside radius equal to the outside radius of the core and shall have a rigidly attached handle. A split core barrel of the required radius cut in half vertically and welded to a strap iron handle is suitable for this purpose. (See Fig. 1.)

<sup>2</sup> Annual Book of ASTM Standards, Vol 04.03.

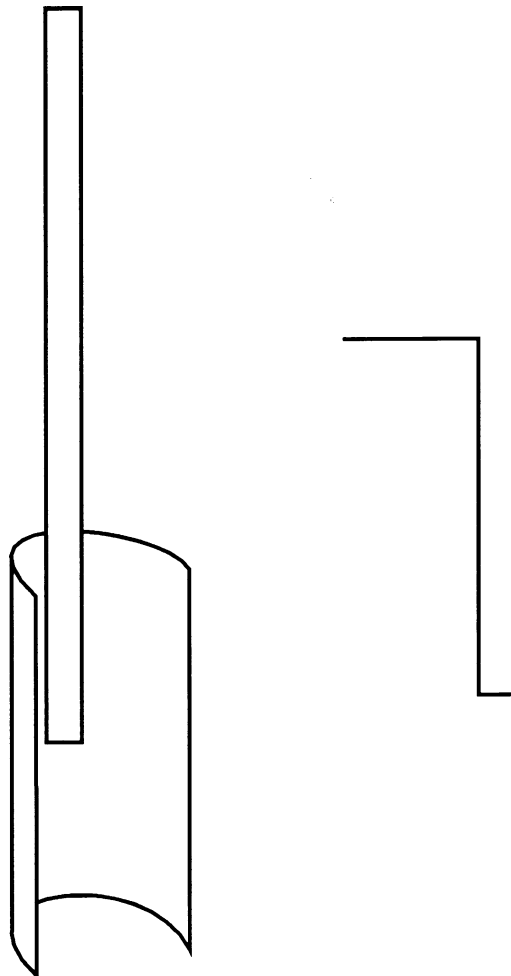


FIG. 1 Core Debonder

NOTE 1—Differences in manufacturers' tolerances of core barrels' diameters and thicknesses may result in a particular barrel not fitting into the kerf. In such cases, other means may have to be used for debonding.

4.6 A lifting device (core lifter) for removing core samples from holes will preserve the integrity of the core. The device shall be a steel rod of suitable length and with a diameter that will fit into the space between the core and the pavement material. There shall be a 90° bend at the top to form a handle and a 90° bend at the bottom, approximately ~~2 in. (50 mm)~~ 50 mm (2 in.) long, to form the lifter.

## 5. Sampling

5.1 Take samples in accordance with the provisions of Practice D 979. Random sampling procedures must be followed when samples obtained will be used in conducting quality control/quality assurance tests.

5.2 The sampling plan must include a clear definition as to whether samples can be taken adjacent to the pavement edge or construction joints where density may be slightly lower than in the main portion of the paving lane.

5.3 Variations in the pavement condition that can be detected by visual inspection may dictate that samples be taken from areas so identified, apart from the random sampling plan. However, non-random samples violate the principles behind statistically based quality control/quality assurance testing programs. Samples obtained using non-random procedures must be used for informational purposes only and not included in statistically based quality control/quality assurance programs.

5.4 The number of samples to be secured will be in accordance with governing specifications for the lot size involved. When no specific guidelines are available, take a sufficient number of samples to achieve the desired statistical confidence level.

## 6. Sampling Compacted Bituminous Pavement

6.1 Samples taken from the compacted pavement by core drill shall have a minimum nominal diameter of ~~4 in. (100 mm)~~ 100 mm (4 in.) and extend the full depth of the lift(s) being sampled. If test results appear to be erratic or biased in a way attributable to sample size, take larger samples. In order to minimize damage, use a lifting device as described in 4.5 and 4.6 to remove the core from the hole.

6.1.1 When cored samples are to be used for resilient or dynamic modulus tests, the sample must form a right cylinder with the top and bottom perpendicular to the axis. The sample shall comply with the requirements of the particular test method involved.

6.1.2 To separate the sample from the underlying layer, insert the device described in 4.5 into the kerf and exert a gentle pressure toward the sample. Do not attempt to pry upward on the sample. If the bond is not broken between the pavement courses, it will be necessary to secure a sample for the entire pavement depth.

6.1.3 To remove the sample from the hole, insert the device described in 4.6 into the kerf, turn the device approximately 90°, and lift gently until the sample can be grasped by hand.

6.2 Samples taken from the compacted pavement by sawing shall have a minimum surface area of ~~16 in.<sup>2</sup> (400 10 000 mm<sup>2</sup>)~~ 16 in.<sup>2</sup> and be cut in such a manner as not to disturb the sample density. Cutting and removing a ~~2 in. (50 mm)~~ 50 mm (2 in.) wide section surrounding the sample will aid in removal of the portion(s) to be tested. Screwdrivers, chisels, and other sharpened tools used to break the bond between a compacted course and the underlying pavement may cause distortion that will result in an erroneous density determination. If test results appear to be erratic or biased in a way attributable to sample size, take larger samples.

6.3 Transport samples obtained using procedures described in 6.1 or 6.2 on a smooth board, top side down, to retain the shape of the original surface. Careless handling may nullify any test results obtained.

NOTE 2—When the weather is very hot, an ice chest or similar device may be considered for use while transporting the sample to the laboratory.

6.4 When the only purpose of sampling is to measure pavement thickness, samples of smaller dimensions than prescribed in 6.1 and 6.2 may be used.

## 7. Separation of Pavement Courses

7.1 When it becomes necessary to separate two or more pavement courses, first freeze the sample and then cut apart with a saw blade or other approved means. As an alternate to freezing the sample, cooling water can be sprayed on the saw blade to minimize the generation of excessive heat.

7.2 Separation of two pavement courses may sometimes be achieved by striking a swift heavy blow on a chisel at the point of bonding between the two courses. Separation by this procedure is more effectively achieved if the sample is cooled below 0°C (32°F).

## 8. Report

8.1 The test report(s) should include a statement as to the method employed for removal of the sample from the compacted pavement.

## 9. Keywords

9.1 bituminous; compacted; coring bituminous pavement; equipment for sampling bituminous pavement; pavement sampling; sawing bituminous pavement

 **D 5361 – 9500**

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or [service@astm.org](mailto:service@astm.org) (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*