



Designation: D 6418 – 99<sup>ε1</sup>

## Standard Practice for Using the Disposable En Core Sampler for Sampling and Storing Soil for Volatile Organic Analysis<sup>1</sup>

This standard is issued under the fixed designation D 6418; 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.

<sup>ε1</sup> NOTE—The title was corrected editorially in August 1999.

### 1. Scope

1.1 This practice is intended for application to soils that may contain volatile waste constituents.

1.2 This practice provides a procedure for using the disposable En Core<sup>2</sup> sampler to collect and store a soil sample for volatile organic analysis.

1.3 It is recommended that this standard be used in conjunction with Practice D 4547 and Guide D 4687.

1.4 *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.*

NOTE 1—ASTM 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.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D-19 on Water<sup>3</sup>

D 4547 Practice for Sampling Waste and Soils for Volatile Organics<sup>4</sup>

D 4687 Guide for General Planning of Waste Sampling<sup>4</sup>

D 5792 Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives<sup>4</sup>

### 3. Summary of Practice

3.1 This practice provides a procedure for using the disposable

En Core sampler to collect and store a soil sample of approximately 5 or 25 g for volatile organic analysis. The En Core sampler, which consists of a coring body/storage chamber, O-ring sealed plunger, and O-ring sealed cap, is designed to collect and hold a soil sample during shipment to the laboratory for analysis.

3.2 After the sample is collected in the En Core sampler, the coring body/storage chamber is sealed with a slide-on cap and immediately becomes a sample storage chamber. To minimize loss of volatile compounds due to volatilization, or biodegradation, or both, from the time of collection until analysis or preservation in the laboratory (see Practice D 4547), sample storage in the device currently is specified at  $4 \pm 2^\circ\text{C}$  for up to 48 h. For cases where holding times beyond 48 h are necessary, storage of samples in the En Core sampler at  $4 \pm 2^\circ\text{C}$  or  $-12 \pm 2^\circ\text{C}$  for longer than 48 h is an option, provided it can be shown that the longer storage time used does not influence the concentrations of the volatile organic compounds (VOCs) of interest in the samples, or that the data generated by analysis of the samples meet the data quality objectives (DQOs), (see Practice D 5792). This practice does not use methanol preservation or other chemical preservatives in the field.

### 4. Significance and Use

4.1 This practice is for use in collecting and storing 5- or 25-g soil samples for volatile organic analysis in a manner that minimizes loss of contaminants due to volatilization, or biodegradation, or both. The En Core sampler serves as both the sampling device and sample storage chamber.

4.2 In performing the practice, the integrity of the soil sample structure is maintained during sample collection, storage, and transfer in the laboratory for analysis or preservation.

4.3 During sample collection, storage, and transfer, there is very limited exposure of the sample to the atmosphere.

4.4 Laboratory subsampling is not required when performing this practice. The sample is expelled directly from the coring body/storage chamber into the appropriate container for analysis or preservation without disrupting the integrity of the sample. Subsampling from the En Core device should not be performed to obtain smaller sample sizes for analysis.

4.5 This practice specifies sample storage in the En Core sampler at  $4 \pm 2^\circ\text{C}$  for up to 48 h. For cases where holding

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.03 on Sampling Equipment.

Current edition approved June 10, 1999. Published August 1999.

<sup>2</sup> En Core is a registered trademark of En Novative Technologies, Inc., Green Bay, WI. The En Core sampler is covered by a patent. Interested parties are invited to submit information regarding the identification of an alternative(s) to this patented item to the ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

<sup>3</sup> Annual Book of ASTM Standards, Vol 11.01.

<sup>4</sup> Annual Book of ASTM Standards, Vol 11.04.

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times beyond 48 h are necessary, storage of samples in the En Core sampler at  $4 \pm 2^\circ\text{C}$  or  $-12 \pm 2^\circ\text{C}$  for longer than 48 h is an option, provided it can be shown that the longer storage time used does not influence the concentrations of the VOCs of interest in the samples, or that the data generated by analysis of the samples meet the DQOs (see Practice D 5792).

4.6 This practice does not use methanol preservation or other chemical preservatives in the field. As a result, there are no problems associated with flammability hazards, shipping restrictions, or dilution of samples containing low volatile concentrations due to solvents being added to samples in the field.

4.7 The En Core sampler is a single-use device. It should not be cleaned, or reused, or both.

4.8 This practice cannot be used for sampling cemented material, consolidated material, or material having fragments coarse enough to interfere with proper coring techniques.

### 5. Apparatus

5.1 *En Core Sampler*—The En Core sampler has three components: the coring body/storage chamber, which is volumetrically designed to collect and store a soil sample of approximately 5 or 25 g; an O-ring sealed plunger for nondisruptive extrusion of the sample into an appropriate container for analysis or preservation; and, a slide-on cap having an O-ring seal and locking arm mechanism (see Fig. 1). The coring body/storage chamber of the 5-g sampler has a volume of  $3 \text{ cm}^3$  to give a sample size of approximately 5 g,

assuming a soil density of  $1.7 \text{ g/cm}^3$ . The coring body/storage chamber of the 25-g sampler has a volume of  $14.5 \text{ cm}^3$  to give a sample size of approximately 25 g, assuming a soil density of  $1.7 \text{ g/cm}^3$ . The seals of the sampler are provided by three polytetrafluoroethylene-coated fluoroelastomer O-rings (see Fig. 1). The coring body/storage chamber, plunger, and cap of the En Core sampler are constructed of an inert composite polymer. The En Core sampler is certified as clean and should not be reused. There are two stainless steel reusable attachments that are used with the En Core sampler. These are a T-handle, which is used to push the sampler into the soil for sample collection; and an extrusion tool, which attaches to the plunger for extrusion of the sample from the coring body/storage chamber (see Fig. 2). Each En Core sampler is supplied with a protective moisture-proof bag for shipment to the laboratory.

5.2 *Minimum/Maximum Thermometer*—This is any thermometer that registers the minimum and maximum temperatures reached during any given period of time in  $^\circ\text{C}$  and has a range that includes the specified storage temperature in divisions of  $1^\circ\text{C}$ .

### 6. Procedure

6.1 The size of the En Core sampler used is determined by the size of the sample required by the laboratory procedure that will be used to analyze the sample. If a sample size of approximately 5 g is required for analysis, the 5-g En Core sampler, and not the 25-g device, should be used to collect and

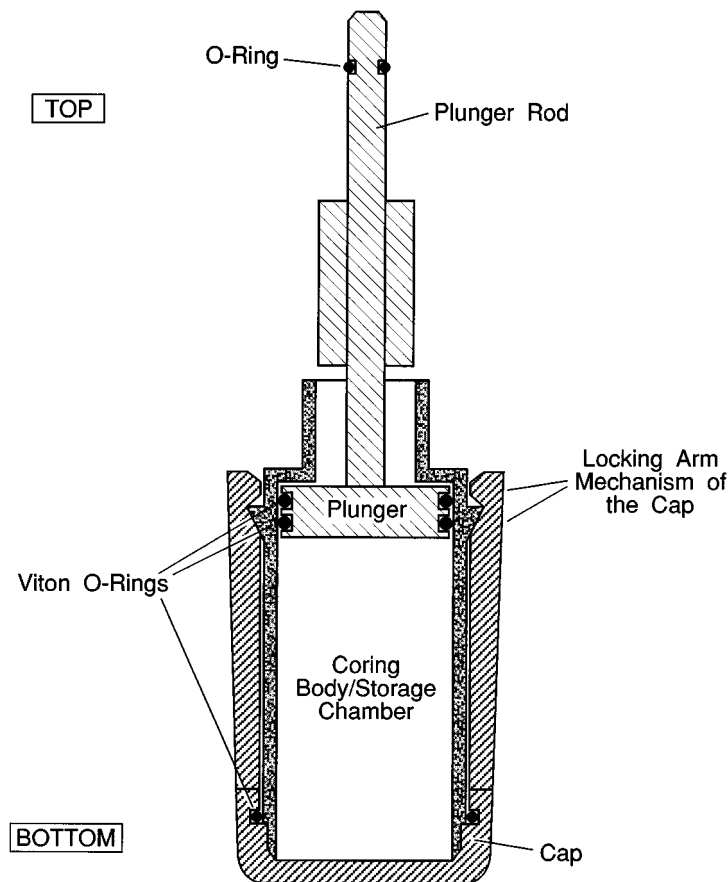


FIG. 1 Components of the En Core Sampler

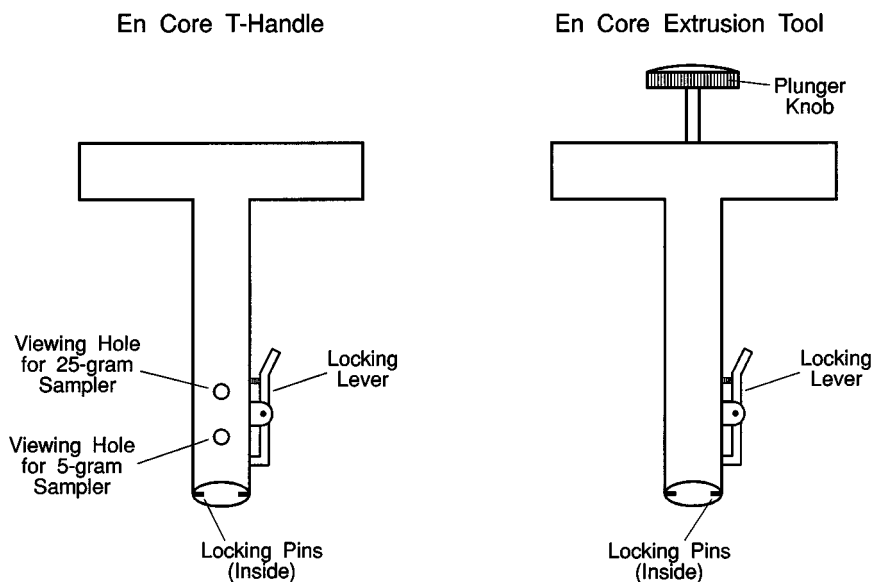


FIG. 2 Reusable Attachments to the En Core Sampler

store the sample. Subsampling from the En Core devices should not be performed to obtain smaller sample sizes for analysis.

6.2 If volatile contaminant levels in the soil being sampled are not known, it is recommended that three samples be collected at each sampling location using three En Core samplers. If determination of moisture content is required for reporting sample results on a dry weight basis, a fourth sample should be collected from each sampling location using a suitable container. The proper sample preparation method for low-level or high-level volatile analysis<sup>5,6</sup> can be determined by screening one of the three samples collected in the En Core samplers for high or low concentrations of VOCs. If a high concentration is present, one of the remaining samples in the En Core devices can be extruded into methanol for high-level analysis; if a low concentration is present, the two remaining samples in the En Core devices can be extruded into two appropriate vials for low-level analysis giving an additional low-level sample for analysis, if needed. For guidance on sample collection, sample handling, and sample preparation methods for volatile organic analysis, see Practice D 4547. For quality assurance considerations related to field sampling, see Guide D 4687.

6.3 As stated in 4.8, the En Core device cannot be used for sampling cemented material, consolidated material, or material having fragments coarse enough to interfere with proper coring techniques.

6.4 *Sample Collection*—The manufacturer's specific instructions for operating the En Core sampler and T-handle to collect a soil sample should be followed. The steps involved in sample collection using the En Core sampler are given below.

6.4.1 Before collecting a sample in the En Core sampler, the plunger rod (see Fig. 1) should be positioned so that the plunger can be moved freely from the top to the bottom of the coring body/storage chamber. For sample collection, the T-handle (see Fig. 2) should be attached to the sampler, and the plunger should be positioned so that the bottom of the plunger is flush with the bottom of the coring body/storage chamber. This prevents air from being trapped in the device during sample collection. When inserting a coring device into a surface for sample collection, air should not be trapped behind the sample. If this occurs, air can pass through the soil causing VOCs to be lost, or it can cause the sample to be prematurely pushed from the coring device.

6.4.2 Sample collection should be performed as quickly as possible. Using the T-handle, push the En Core sampler into the soil until the coring body/storage chamber is completely full. It can be verified that the coring body/storage chamber is full by looking into the appropriate viewing hole (either 5 or 25-g) in the T-handle (see Fig. 2). The coring body/storage chamber is completely full if the small O-ring on the plunger rod (see Fig. 1) is centered in the T-handle viewing hole. If possible, look at the viewing hole while the device is in the soil to check if the coring body/storage chamber is completely full. If it is not possible to view the hole when the device is in the soil, remove the sampler from the soil to view the hole. If the coring body/storage chamber is not completely full, quickly insert the device back into the same sampling spot and push harder to fill the coring body/storage chamber. When the coring body/storage chamber is completely full, scrape a spatula across the bottom of the coring body/storage chamber so the surface of the soil in the sampler is flush with the opening of the coring body/storage chamber (see Note 2). Quickly wipe the external surface of the coring body/storage chamber with a clean tissue or cloth. After ensuring that the sealing surfaces are clean, cap the coring body/storage chamber while it is still on the T-handle. This is done by gently sliding the cap onto the coring body/storage chamber with a twisting motion.

<sup>5</sup> U.S. EPA, 1996, Method 5035: Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846)*, Vol 1B, Final Update III.

<sup>6</sup> U.S. EPA, 1996, Method 5021: Volatile Organic Compounds in Soils and Other Solid Matrices Using Equilibrium Headspace Analysis. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846)*, Vol 1B, Final Update III.