



Designation: D 6907 – 05

Standard Practice for Sampling Soils and Contaminated Media with Hand- Operated Bucket Augers¹

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1. Scope

1.1 This practice describes the procedures and equipment used to collect surface and subsurface soil and contaminated media samples for chemical analysis using a hand-operated bucket auger (hereafter referred to as a bucket auger; sometimes referred to as a barrel auger). Several types of bucket augers exist and are designed for sampling various types of soil. All bucket augers collect disturbed samples, but bucket augers can also be used to auger to the desired sampling depth and then, using a core-type sampler, collect a relatively undisturbed sample.

1.2 This practice does not cover the use of large (12-in. or greater diameter) bucket augers mechanically operated by large drill rigs or similar equipment, such as those described in Practice D 1452, section 3.2.4.

1.3 The term bucket auger is used to differentiate this type of hand operated auger from others of the solid or hollow stem types that are also hand held or operated.

1.4 This practice does not address sampling objectives (see Practice D 5792), general sample planning (see Guide D 4687), sampling design (for example, where to collect samples and what depth to sample [see Guide D 6044]), sampling for volatile organic compounds (see Guide D 4547), equipment cleaning and decontamination (see Practice D 5088), sample handling after collection such as compositing and subsampling (see Guide D 6051), and sample preservation. For information on other types of augers, see Practice D 1452 and Guide D 4700.

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.*

¹ This practice is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01 on Monitoring and Characterization.

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2. Referenced Documents

2.1 *ASTM Standards:*²

D 1452 Practice for Soil Investigation and Sampling by Auger Borings

D 4547 Guide for Sampling Wastes and Soils for Volatile Organic Compounds

D 4687 Guide for General Planning of Waste Sampling

D 4700 Guide for Soil Sampling from the Vadose Zone

D 5088 Practice for Decontamination of Field Equipment used at Waste Sites

D 5283 Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation

D 5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock

D 5681 Terminology for Waste and Waste Management

D 5792 Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives

D 6044 Guide for Representative Sampling for Management of Waste and Contaminated Media

D 6051 Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities

D 6232 Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities

D 6282 Guide for Direct Push Soil Sampling for Environmental Soil Characterization

D 6286 Guide for Selection of Drilling Methods for Environmental Site Characterization

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. Terminology

3.1 *Definitions*—Except where noted, all terms and symbols in this practice are in accordance with the following publications. In order of consideration they are:

- 3.1.1 Terminology D 5681 for Waste and Waste Management,
- 3.1.2 Compilation of ASTM Standard Terminology, and
- 3.1.3 Webster’s New Collegiate Dictionary.

4. Summary of Practice

4.1 Typically, bucket augers are tubular devices with cutting bits on the bottom that are pushed and twisted into the media and removed when the tubular “bucket” section is full. The borehole is advanced one bucket at a time. The practical depth of investigation using a bucket auger is related to the material being sampled.

4.2 When a sampling interval starting at the surface is to be sampled, the same auger can be used to collect all materials to the bottom of the interval. However, if discrete grab samples are to be collected to characterize multiple depths or a depth interval commences below the surface, a clean bucket auger should be used to collect the sample. The top material in a bucket should generally be discarded to minimize chances of cross-contamination of the sample from material that sloughs from the borehole wall.

4.3 All augers collect disturbed samples that are generally not suitable for analysis of volatile organic compounds.

NOTE 1—Bucket augers may be used to obtain samples of materials containing volatile organic compounds for field screening purposes. A core or tube type sampler can be pushed into undisturbed soil at the bottom of an augered hole to collect a relatively undisturbed sample suitable for chemical analysis.

5. Significance and Use

5.1 Bucket augers are relatively inexpensive, readily available, available in different types depending on the media to be sampled, and most can be easily operated by one person. They collect a reasonably cylindrical but disturbed sample of surface or subsurface soil or waste. However, they are generally not suited for sampling gravelly or coarser soil and are unsuitable for sampling rock.

5.2 Bucket augers are commonly used equipment because they are inexpensive to operate, especially compared to powered equipment (that is, direct push and drill rigs). When evaluated against screw augers, bucket augers generally collect larger samples with less chance of mixing with soil from shallower depths because the sample is retained within the auger barrel. Bucket augers are commonly used to depths of 3 m but have been used to much greater depths depending upon the soil or waste characteristics. The sampling depth is limited by the force required to rotate the auger and the depth at which the borehole collapses (unless bore casings or liners are used).

5.3 Bucket augers may not be suitable for the collection of samples for determination of volatile organic compounds because the sample is disturbed during the collection process, which may lead to losses resulting in a chemically unrepresentative sample.

6. Apparatus

6.1 *Bucket Augers*:

6.1.1 Bucket augers for soil sampling generally consist of a tubular auger head with cutting bits, an extension rod or rods, and a “T” handle (see Fig. 1). The auger is rotated using the “T” handle until the bucket is full, the device retrieved and emptied, and the process repeated.

6.1.2 The advantages and disadvantages of bucket augers are listed in Table 1.

6.1.3 Bucket augers are generally available with tungsten carbide hard surface carbon steel bits, stainless steel cylinder and carbon steel bail (shank), or in all stainless steel (see Fig. 1). Several types of bucket augers are described below. In use, bits should be kept sharp for efficient sampling.

6.1.4 *Regular Bucket Auger*—Used for ordinary soil and waste sampling and for creating a pilot hole from which subsequent undisturbed core samples can be collected at depth. (See Fig. 2a).

6.1.5 *Sand Bucket Auger*—Designed for use in extremely dry, sandy soils. The bits are specially formed to retain loose sand (see Fig. 2b).

6.1.6 *Mud Bucket Auger*—Features an open cylinder design to facilitate easier removal of heavy, wet soil or clay samples. Bits are spaced further apart than the regular auger to ease entry of sticky soils (see Fig. 2c).

6.1.7 *The Planer Auger*—Used to remove loose material from the bottom of an augered hole, prior to core sampling. It may also be used to collect samples of solid materials from the bottom of drums and tanks (see Fig. 2d).

6.1.8 *Dutch Auger*—Designed to make it an excellent tool for collection of samples in heavily rooted, fibrous or swampy areas (see Fig. 2e).

6.1.9 *Other*—Other types of augers include the Eijkelkamp Stony Auger for gravelly soils, the Post-Hole or Iwan Auger for cohesive soft or hard soils, and augers with reusable liners and closed tops to reduce contamination from sloughing sidewalls.

7. Presampling

7.1 Samples should be collected in accordance with an appropriate work plan (see Practice D 5283 and Guide D 4687) and in accordance with the Data Quality Objectives (see Practice D 5792). The plan should include a worker health and safety plan and safety section due to the hazards of sampling contaminated media.

7.2 Field personnel should be trained or be knowledgeable in the sampling procedures.

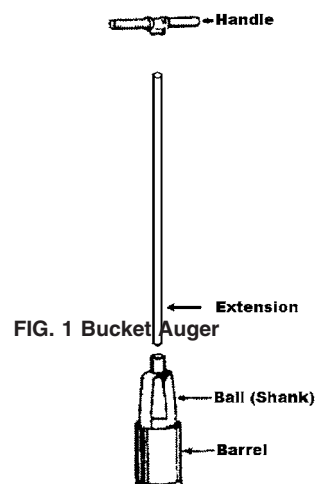


FIG. 1 Bucket Auger