



Designation: D5784/D5784M – 18 (Reapproved 2025)

Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water Quality Monitoring Devices¹

This standard is issued under the fixed designation D5784/D5784M; 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 guide covers how hollow-stem auger-drilling systems may be used for geoenvironmental exploration and installation of subsurface water quality monitoring devices.

1.2 Hollow-stem auger drilling for geoenvironmental exploration and monitoring device installations often involves safety planning, administration, and documentation. This guide does not purport to specifically address exploration and site safety.

NOTE 1—This guide does not include considerations for geotechnical site characterizations that are addressed in a separate guide.

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 are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this guide may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

1.6 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D1586/D1586M Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils

D1587/D1587M Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes (Withdrawn 2024)³

D2113 Practice for Rock Core Drilling and Sampling of Rock for Site Exploration (Withdrawn 2023)³

D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D2488 Practice for Description and Identification of Soils (Visual-Manual Procedures)

D3550/D3550M Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D4428/D4428M Test Methods for Crosshole Seismic Testing of Soil and Rock

D5088 Practice for Decontamination of Field Equipment Used at Waste Sites

D5092/D5092M Practice for Design and Installation of Groundwater Monitoring Wells

D5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock (Withdrawn 2021)³

¹ This guide is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.21 on Groundwater and Vadose Zone Investigations.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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

*A Summary of Changes section appears at the end of this standard

D5521/D5521M Guide for Development of Groundwater Monitoring Wells in Granular Aquifers
D6151/D6151M Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling (Withdrawn 2024)³

3. Terminology

3.1 *Definitions*—For definitions of common technical terms used in this standard, refer to Terminology **D653**.

4. Significance and Use

4.1 Hollow-stem auger drilling may be used in support of geoenvironmental exploration (Practice **D3550/D3550M**, Test Method **D4428/D4428M**) and for installation of subsurface water quality monitoring devices in unconsolidated sediment. Hollow-stem auger drilling may be selected over other methods based on the advantages over other methods. These advantages include: the ability to drill without the addition of drilling fluid(s) to the subsurface, and hole stability for sampling purposes (see Test Method **D1586/D1586M** and Practices **D1587/D1587M**, **D2487**, **D2488**, and **D6151/D6151M**) and monitoring well construction in unconsolidated to poorly indurated materials. This drilling method is generally restricted to the drilling of shallow, unconsolidated sediment or softer rocks. The hollow-stem drilling method is a favorable method to be used for obtaining cores and samples and for the installation of monitoring devices in many, but not every geologic environment.

NOTE 2—In many geologic environments the hollow-stem auger drilling method can be used for drilling, sampling, and monitoring device installations without the addition of fluids to the borehole. However, in cases where heaving water-bearing sands or silts are encountered, the addition of water or drilling mud to the hollow-auger column may become necessary to inhibit the piping of these fluid-like materials into the augers. These drilling conditions, if encountered, should be documented.

4.1.1 The application of hollow-stem augers to geoenvironmental exploration may involve groundwater and soil sampling, in situ or pore-fluid testing, or utilization of the hollow-auger column as a casing for subsequent drilling activities in unconsolidated or consolidated materials (Test Method **D2113**).

NOTE 3—The user may install a monitoring device within the same auger borehole wherein sampling or in situ or pore-fluid testing was performed.

4.1.2 The hollow-stem auger column may be used as a temporary casing for installation of a subsurface water quality monitoring device. The monitoring device is usually installed as the hollow-auger column is removed from the borehole.

4.2 The subsurface water quality monitoring devices that are addressed in this guide consist generally of a screened or porous intake device and riser pipe(s) that are usually installed with a filter pack to enhance the longevity of the intake unit, and with isolation seals and low-permeability backfill to deter the movement of fluids or infiltration of surface water between hydrologic units penetrated by the borehole (see Practice **D5092/D5092M**). A piezometer is primarily a device used for measuring subsurface hydraulic heads, the conversion of a piezometer to a water quality monitoring device should be

made only after consideration of the overall quality and integrity of the installation, to include the quality of materials that will contact sampled water or gas.

NOTE 4—Both water quality monitoring devices and piezometers should have adequate casing seals, annular isolation seals, and backfills to deter the movement of fluids between hydrologic units.

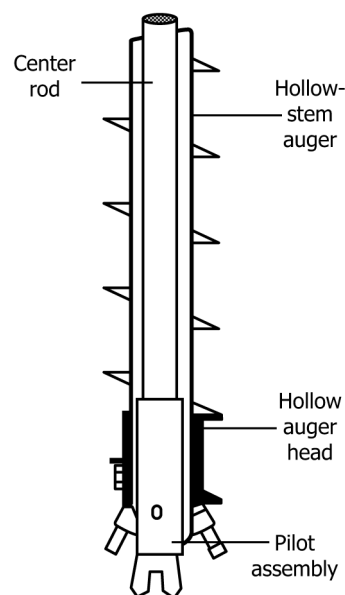
NOTE 5—The quality of the result produced by this standard is dependent on the competence of the personnel performing it and the suitability of the equipment and facility used. Agencies that meet the criteria of Practice **D3740** are generally considered capable of competent and objective testing/sampling/inspection. Reliable results depend on many factors; Practice **D3740** provides a means of evaluating some, but not all, of those factors.

5. Apparatus

5.1 Each auger section of the hollow-stem auger-column assembly consists of a cylindrical tube with continuous helical flighting rigidly attached to the outer surface of the tube (see Fig. 1). The hollow-auger section has a coupling at each end for attachment of a hollow-auger head to the bottom end of the lead auger section and for attachment of additional auger sections at the top end to make up the articulated hollow-stem auger column.

NOTE 6—The inside diameter of the hollow-stem auger column is usually selected to provide an opening large enough for insertion of monitoring-device components such as the screened intake and filter pack and installation devices such as a tremie pipe. When media sampling is needed, the optimum opening should permit easy insertion and retraction of a sampler or core barrel. When a monitoring device is installed, the annular opening should provide easy insertion of a pipe with an inside diameter large enough for placing completion materials adjacent to the riser.

5.1.1 *Hollow-Auger Head*, attached to the lead auger of the hollow-auger column and usually contains replaceable, abrasion-resistant cutters or teeth (see Fig. 1). As the hollow-auger head is rotated, it cuts and directs the cuttings to the auger flights which convey the cuttings to the surface.



NOTE 1—Various pilot assemblies not shown here may vary.
FIG. 1 Sketch Showing Basic Hollow-Stem Auger Components