



Designation: D4696 – 18

## Standard Guide for Pore-Liquid Sampling from the Vadose Zone<sup>1</sup>

This standard is issued under the fixed designation D4696; 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 guide covers the equipment and procedures used for sampling pore-liquid from the vadose zone (unsaturated zone). The guide is limited to in situ techniques and does not include soil core collection and extraction methods for obtaining samples.

1.2 The term “pore-liquid” is applicable for liquids from aqueous pore-liquid to oil. However, the samplers described in this guide were designed, and are used to sample aqueous pore-liquids only. The abilities of these samplers to collect other pore-liquids may be quite different than those described.

1.3 Some of the samplers described in this guide are not currently commercially available. These samplers are presented because they may have been available in the past, and may be encountered at sites with established vadose zone monitoring programs. In addition, some of these designs are particularly suited to specific situations. If needed, these samplers could be fabricated.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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

1.6 *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.*

1.7 *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:<sup>2</sup>

**D653 Terminology Relating to Soil, Rock, and Contained Fluids**

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

### 3. Terminology

#### 3.1 Definitions—

3.1.1 For common definitions of terms in this standard, refer to Terminology **D653**.

#### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *air entry value,  $n$ —in vadose zone*, the applied suction at which water menisci of the porous segment of a suction sampler break down, and air enters.

3.2.2 *bubbling pressure,  $n$ —in vadose zone*, the applied air pressure at which water menisci of the porous segment of a suction sampler break down, and air exits.

3.2.3 *cascading water,  $n$ —in groundwater*, perched groundwater that enters a well casing via cracks or uncovered perforations, trickling, or pouring down the inside of the casing.

3.2.4 *hydrophobicity,  $n$ —in vadose zone*, the property that defines a material as being water repellent. Water exhibits an obtuse contact angle with hydrophobic materials.

<sup>1</sup> 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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<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.

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