



Designation: D4106 – 20

Standard Practice for (Analytical Procedure) for Determining Transmissivity and Storage Coefficient of Nonleaky Confined Aquifers by the Theis Nonequilibrium Method¹

This standard is issued under the fixed designation D4106; 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 practice covers an analytical procedure for determining the transmissivity and storage coefficient of a nonleaky confined aquifer. It is used to analyze data on water-level response collected during radial flow to or from a well of constant discharge or injection.

1.2 This analytical procedure, along with others, is used in conjunction with the field procedure given in Test Method [D4050](#).

1.3 *Limitations*—The limitations of this practice for determination of hydraulic properties of aquifers are primarily related to the correspondence between the field situation and the simplifying assumptions of this practice (see [5.1](#)).

1.4 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice [D6026](#).

1.4.1 The procedures used to specify how data are collected/recorded or calculated, in this standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objectives; and it is common practice to increase or reduce significant digits of reported data to be commensurate with these considerations. It is beyond the scope of this standard to consider significant digits used in analytical methods for engineering design.

1.5 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of the practice 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 the 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 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.*

1.7 *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:*²

- [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](#)
- [D4043 Guide for Selection of Aquifer Test Method in Determining Hydraulic Properties by Well Techniques](#)
- [D4050 Test Method for \(Field Procedure\) for Withdrawal and Injection Well Testing for Determining Hydraulic Properties of Aquifer Systems](#)
- [D6026 Practice for Using Significant Digits in Geotechnical Data](#)

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of common technical terms used in this practice, refer to Terminology [D653](#).

¹ This practice 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 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