Designation: D 6028 – 96

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
Reprinted from the Annual Book of ASTM Standards. Copyright ASTM

Standard Test Method (Analytical Procedure) for Determining Hydraulic Properties of a Confined Aquifer Taking into Consideration Storage of Water in Leaky Confining Beds by Modified Hantush Method[1]

This standard is issued under the fixed designation D 6028; 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 test method covers an analytical procedure for determining the transmissivity and storage coefficient of a confined aquifer taking into consideration the change in storage of water in overlying or underlying confining beds, or both. This test method is used to analyze water-level or head data collected from one or more observation wells or piezometers during the pumping of water from a control well at a constant rate. With appropriate changes in sign, this test method also can be used to analyze the effects of injecting water into a control well at a constant rate.

1.2 This analytical procedure is used in conjunction with Test Method D 4050.

1.3 *Limitations*—The valid use of the modified Hantush method **(1)**[2] is limited to the determination of hydraulic properties for aquifers in hydrogeologic settings with reasonable correspondence to the assumptions of the Hantush-Jacob method (Test Method D 6029) with the exception that in this case the gain or loss of water in storage in the confining beds is taken into consideration (see 5.1). All possible combinations of impermeable beds and source beds (for example, beds in which the head remains uniform) are considered on the distal side of the leaky beds that confine the aquifer of interest (see Fig. 1).

1.4 The values stated in SI units are to be regarded as 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 653 Terminology Relating to Soil, Rocks, and Contained Fluids[3]

D 4050 Test Method (Field Procedure) for Withdrawal and Injection Well Tests for Determining Hydraulic Properties of Aquifer Systems[3]

D 4106 Test Method (Analytical Procedure) for Determining Transmissivity and Storage Coefficient of Nonleaky Confined Aquifers by the Theis Nonequilibrium Method[3]

D 6029 Test Method (Analytical Procedure) for Determining Hydraulic Properties of a Confined Aquifer and a Leaky Confining Bed with Negligible Storage by the Hantush Jacob Method[4]

3. Terminology

3.1 *Definitions:*

3.1.1 *aquifer, confined*, *n*—an aquifer bounded above and below by confining beds and in which the static head is above the top of the aquifer.

3.1.2 *aquifer, unconfined*, *n*—an aquifer is unconfined where it has a water table.

3.1.3 *coefficient of leakage*, *n*—see *leakance*.

3.1.4 *confining bed*, *n*—a hydrogeologic unit of less permeable material bounding one or more aquifers.

3.1.5 *control well*, *n*—well by which the head and flow in the aquifer is changed, for example, by pumping, injection, or change of head.

3.1.6 *drawdown*, *n*—vertical distance the static head is lowered due to the removal of water.

3.1.7 *head*, *n*—see *head, static*.

3.1.8 *head, static*, *n*—the height above a standard datum of the surface of a column of water (or other liquid) that can be supported by the static pressure at a given point.

3.1.9 *hydraulic conductivity*, *n*—(field aquifer test) the volume of water at the existing kinematic viscosity that will move in a unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.

3.1.10 *leakance*, *n*—the ratio of the vertical hydraulic conductivity of a confining bed to its thickness.

3.1.11 *observation well*, *n*—a well open to all or part of an aquifer.

3.1.12 *piezometer*, *n*—a device used to measure static head at a point in the subsurface.

3.1.13 *specific storage*, *n*—the volume of water released

[1] This test method is under the jurisdiction of Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.21 on Ground Water and Vadose Zone Investigations.

Current edition approved Oct. 10, 1996. Published April 1997.

[2] The boldface numbers in parentheses refer to a list of references at the end of this test method.

[3] *Annual Book of ASTM Standards*, Vol 04.08.

[4] *Annual Book of ASTM Standards*, Vol 04.09.