



Standard Practice for (Field Procedure) for Constant Drawdown Tests in Flowing Wells for Determining Hydraulic Properties of Aquifer Systems¹

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1. Scope

1.1 This practice covers the methods for controlling drawdown and measuring discharge rates and head to analyze the hydraulic properties of an aquifer or aquifers.

1.2 This practice is used in conjunction with analytical procedures such as those of Jacob and Lohman (1)/(2), and Hantush (3)/(4).

1.3 The appropriate field and analytical procedures for determining hydraulic properties of aquifer systems are selected as described in Guide D 4043.

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

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 this 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 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.*

2. Referenced Documents

2.1 ASTM Standards:

D 653 Terminology Relating to Soil, Rock, and Contained Fluids²

D 4043 Guide for Selection of Aquifer-Test Method in Determining of Hydraulic Properties by Well Techniques²

D 4750 Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)²

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, see Terminology D 653.

4. Summary of Practice

4.1 This practice describes the field procedures for conducting an aquifer test on a well that is flowing, that is, the head in the well remains above the top of the well casing. This method involves inducing a constant drawdown and measuring the varying discharge rate from the control well.

5. Significance and Use

5.1 Constant drawdown test procedures are used with appropriate analytical procedures to determine transmissivity, hydraulic conductivity, and storage coefficient of aquifers.

6. Apparatus

6.1 Various types of equipment can be used to measure the flow rate of the well. The equipment shall be sized so that it does not constrict the flow rate from the well.

6.2 An apparatus shall be placed on the control well discharge line such that the well can be shut in to prevent flow prior to conducting this field procedure and so that the apparatus will not constrict flow from the well when it is allowed to flow.

6.3 Head measurements can be made using one of the following apparatuses:

6.3.1 *Standpipe*—A pipe or piece of well casing may be installed to extend above the elevation of the discharge. This standpipe will also extend above the elevation of the head in the control well. This standpipe will allow for direct measurement of the water level following methods described in Test Method D 4750.

6.3.2 *Pressure Measurement*—A pressure gage (mechanical gage, manometer, or pressure transducer) may be installed below the shut-in mechanism in the control well. Determine the head elevation by adding the pressure reading (expressed in the height of the water) to the elevation of the sensor of the pressure gage.

6.4 *Control Well*—This practice requires that water flow from a single well. This well, known as the control well, shall

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 Ground Water and Vadose Zone Investigations.

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² *Annual Book of ASTM Standards*, Vol 04.08.