



Designation: D5447 – 17

Standard Guide for Application of a Numerical Groundwater Flow Model to a Site-Specific Problem¹

This standard is issued under the fixed designation D5447; 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 the application and subsequent documentation of a groundwater flow model to a particular site or problem. In this context, “groundwater flow model” refers to the application of a mathematical model to the solution of a site-specific groundwater flow problem.

1.2 This guide illustrates the major steps to take in developing a groundwater flow model that reproduces or simulates an aquifer system that has been studied in the field. This guide does not identify particular computer codes, software, or algorithms used in the modeling investigation.

1.3 This guide is specifically written for saturated, isothermal, groundwater flow models. The concepts are applicable to a wide range of models designed to simulate subsurface processes, such as variably saturated flow, flow in fractured media, density-dependent flow, solute transport, and multiphase transport phenomena; however, the details of these other processes are not described in this guide.

1.4 This guide is not intended to be all inclusive. Each groundwater model is unique and may require additional procedures in its development and application. All such additional analyses should be documented, however, in the model report.

1.5 This guide is one of a series of standards on groundwater model applications. Other standards include [D5981](#), [D5490](#), [D5609](#), [D5610](#), [D5611](#), and [D6033](#).

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 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.

1.8 *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

[D5490](#) Guide for Comparing Groundwater Flow Model Simulations to Site-Specific Information

[D5609](#) Guide for Defining Boundary Conditions in Groundwater Flow Modeling

[D5610](#) Guide for Defining Initial Conditions in Groundwater Flow Modeling

[D5611](#) Guide for Conducting a Sensitivity Analysis for a Groundwater Flow Model Application

[D5981](#) Guide for Calibrating a Groundwater Flow Model Application (Withdrawn 2017)³

[D6033](#) Guide for Describing the Functionality of a Groundwater Modeling Code

3. Terminology

3.1 Definitions:

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 service@astm.org. 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