



Standard Practice for Determining Water Injectivity Through the Use of On-Site Floods¹

This standard is issued under the fixed designation D4520; 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 a procedure for conducting on-site core flood tests to determine the filtration and chemical treatment requirements for subsurface injection of water.^{2, 3}

1.2 This practice applies to water disposal, secondary recovery, and enhanced oil recovery projects and is applicable to injection waters with all ranges of total dissolved solids contents.

1.3 The values stated in SI units are to be regarded separately as standard. The values stated in each system are mathematical conversions and may not be exact equivalents; therefore, each system shall be used independently of the other.

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.*

2. Referenced Documents

2.1 ASTM Standards:⁴

D420 Guide to Site Characterization for Engineering Design and Construction Purposes (Withdrawn 2011)⁵

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D1129 Terminology Relating to Water

D2434 Test Method for Permeability of Granular Soils (Constant Head)

D4404 Test Method for Determination of Pore Volume and Pore Volume Distribution of Soil and Rock by Mercury Intrusion Porosimetry

2.2 American Petroleum Institute Standards:⁶

API RP27 Recommended Practice for Determining Permeability of Porous Media

API RP40 Recommended Practice for Core-Analysis Procedure

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms relating to water and water chemistry, refer to Terminology **D1129**. Refer to Terminology **D653** for definitions relating to soil and rock

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *filtration requirement, n*—the maximum suspended solids size (in micrometres) allowed in an injection water to minimize formation plugging.

3.2.2 *test core, n*—a sample cut from a full-core that has been recovered from the formation into which water is injected.

3.2.3 *permeability, n*—the capacity of a rock (or other porous medium) to conduct liquid or gas; permeability is measured as the proportionality constant between flow velocity and hydraulic gradient.

3.2.4 *pore volume, n*—the porous medium's void-volume that can be saturated with the transmitted fluid.

3.2.5 *porosity, n*—the ratio (usually expressed as a percentage) of the volume of voids of a given soil, rock mass, or other porous medium to the total volume of the soil, rock mass, or other porous medium.

3.2.6 *rock-water interaction, n*—a reaction between a porous rock and the injected water causing precipitation or swelling or release of fines (clays) within the rock.

4. Summary of Practice

4.1 This practice assumes that the injection water has been characterized in terms of dissolved and suspended solids

¹ This practice is under the jurisdiction of ASTM Committee **D19** on Water and is the direct responsibility of Subcommittee **D19.05** on Inorganic Constituents in Water.

Current edition approved Jan. 1, 2013. Published February 2013. Originally approved in 1986. Last previous edition approved in 2008 as D4520 – 03(2008). DOI: 10.1520/D4520-13.

² Farley, J. T., and Redline, D. G., "Evaluation of Flood Water Quality in the West Montalvo Field," *Journal Petroleum Technology*, July 1968, pp. 683–687.

³ McCune, C. C., "On-Site Testing to Define Injection Water Quality Requirements," *Journal Petroleum Technology*, January 1977, pp. 17–24.

⁴ 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.

⁵ The last approved version of this historical standard is referenced on www.astm.org.

⁶ Available from American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005-4070, <http://www.api.org>.