



Standard Test Method for Measurement of Hydraulic Conductivity of Tire Derived Aggregates Using a Rigid Wall Permeameter¹

This standard is issued under the fixed designation D7760; 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 laboratory measurement of the hydraulic conductivity (also referred to as *coefficient of permeability*) of water-saturated tire derived aggregates (TDA) obtained from scrap tires using a rigid-wall permeameter. The tire materials covered in this method include tire chips, tire shreds, and tire derived aggregate (TDA) as described in Practice D6270 with particle sizes ranging from approximately 12 to 305 mm. Whole scrap tires are not included in this standard. A clear trend between hydraulic conductivity and shred size has not been established at a given vertical pressure for shreds ≥ 50 mm (1).²

1.2 A single- or dual-ring permeameter may be used in the tests. A dual-ring permeameter may be preferred over a single-ring permeameter to take into account and prevent short-circuiting of permeant along the sidewalls of the permeameter. The effects of sidewall flow is more significant at high stresses and when the cell diameter is less than 6 times the particle size (1).

1.3 The test method is used under constant head conditions.

1.4 Water is used as the permeant with the test method.

1.5 Test Method D2434 also can be used for determination of hydraulic conductivity of TDAs with sizes smaller than 19 mm under constant head conditions in a rigid-wall permeameter. Method D2434 includes the use of a permeameter with a single ring.

1.6 The standard units for the hydraulic conductivity values are the SI units, unless other units are specified. Hydraulic conductivity has traditionally been expressed in cm/s in the U.S., even though the official SI unit for hydraulic conductivity is m/s.

1.7 *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:*³

D653 Terminology Relating to Soil, Rock, and Contained Fluids

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

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing

D6026 Practice for Using Significant Digits in Geotechnical Data

D6270 Practice for Use of Scrap Tires in Civil Engineering Applications

3. Terminology

3.1 *Definitions:*

3.1.1 For common definitions of terms in this standard, refer to Terminology D653.

3.1.2 For definitions of terms related to scrap tires, refer to Practice D6270.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *hydraulic conductivity, k* —(also referred to as *coefficient of permeability* or *permeability*) the rate of discharge of water under laminar flow conditions through a unit cross-sectional area of porous medium under a unit hydraulic gradient and standard temperature conditions (20 °C).

3.2.2 *hydraulic gradient, i* —the change in total head (head loss, Δh) per unit distance (L) in the direction of fluid flow, in which $i = \Delta h/L$.

3.2.3 *permeameter*—the apparatus (cell) containing the test specimen in a hydraulic conductivity test.

¹ This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.14 on Geotechnics of Sustainable Construction.

Current edition approved June 1, 2012. Published August 2012. DOI: 10.1520/D7760-12

² The boldface numbers in parentheses refer to a list of references at the end of this standard.

³ 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.