



**Designation: D6586 – 03 (Reapproved 2021)**

## **Standard Practice for the Prediction of Contaminant Adsorption on GAC in Aqueous Systems Using Rapid Small-Scale Column Tests<sup>1</sup>**

This standard is issued under the fixed designation D6586; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### **1. Scope**

1.1 This practice covers a test method for the evaluation of granular activated carbon (GAC) for the adsorption of soluble pollutants from water. This practice can be used to estimate the operating capacities of virgin and reactivated granular activated carbons. The results obtained from the small-scale column testing can be used to predict the adsorption of target compounds on GAC in a large column or full-scale adsorber application.

1.2 This practice can be applied to all types of water including synthetically contaminated water (prepared by spiking high-purity water with selected contaminants), potable waters, industrial wastewaters, sanitary wastes, and effluent waters.

1.3 This practice is useful for the determination of breakthrough curves for specific contaminants in water, the determination of the lengths of the adsorbates mass transfer zones (MTZ), and the prediction of GAC usage rates for larger scale adsorbers.

1.4 The following safety caveat applies to the procedure section, Section 10, of this practice: *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.*

1.5 *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.*

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D28 on Activated Carbon and is the direct responsibility of Subcommittee D28.02 on Liquid Phase Evaluation.

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### **2. Referenced Documents**

#### *2.1 ASTM Standards:<sup>2</sup>*

- D1129 Terminology Relating to Water
- D1193 Specification for Reagent Water
- D2652 Terminology Relating to Activated Carbon
- D2854 Test Method for Apparent Density of Activated Carbon
- D2862 Test Method for Particle Size Distribution of Granular Activated Carbon
- D2867 Test Methods for Moisture in Activated Carbon

### **3. Terminology**

#### *3.1 Definitions:*

3.1.1 For definitions of terms in this practice relating to activated carbon, refer to Terminology D2652.

3.1.2 For definitions of terms in this practice relating to water, refer to Terminology D1129.

### **4. Summary of Practice**

4.1 This practice consists of a method for the rapid determination of breakthrough curves and the prediction of GAC usage rates for the removal of soluble contaminants from water. This is accomplished by passing the contaminated water at a constant, controlled rate down flow through a bed of a specially sized granular activated carbon until predetermined levels of breakthrough have occurred.

4.2 When the assumption is made that conditions of constant diffusivity exist within the GAC column, the breakthrough data obtained from the column test can be used to estimate the size and operational conditions for a full-scale carbon adsorber.

### **5. Significance and Use**

5.1 Granular activated carbon (GAC) is commonly used to remove contaminants from water. However if not used properly, GAC can not only be expensive but can at times be ineffective. The development of engineering data for the design

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.