



Designation: D4380 – 12

# Standard Test Method for Density of Bentonitic Slurries<sup>1</sup>

This standard is issued under the fixed designation D4380; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This test method covers the determination of the density of slurries used in slurry construction techniques, such as those used for barriers to control the horizontal movement of liquids. This test method is modified from API Recommended Practice 13B.

1.2 *Units*—The values stated in SI units are to be regarded as standard, unless other units are also specified, such as density in  $\text{lbm/ft}^3$  or  $\text{lbm/gal}$ . No other units of measurement are included in this standard.

1.3 *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.*

1.4 *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:<sup>2</sup>

D653 Terminology Relating to Soil, Rock, and Contained Fluids

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

### 2.2 American Petroleum Institute (API) Standard:

API RP 13B Recommended Practice Standard Procedure for Testing Drilling Fluids (Section 1)<sup>3</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.16 on Grouting.

Current edition approved Aug. 1, 2012. Published November 2012. Originally approved in 1984. Last previous edition approved in 2006 as D4380–84(2006). DOI: 10.1520/D4380-12.

<sup>2</sup> 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.

<sup>3</sup> Available from the American Petroleum Institute, 2101 L St., NW, Washington, DC 20037.

## 3. Terminology

### 3.1 Definitions:

3.1.1 For definitions of terms relating to this test method, refer to Terminology D653.

## 4. Summary of Test Method

4.1 The mud balance is the instrument generally used for this test method. The weight of a fixed volume of the slurry is measured by moving a rider counterweight along a graduated scale. The density of the slurry is then read directly off the graduated scale after the instrument is balanced.

## 5. Significance and Use

5.1 This test method is used to determine the density of bentonitic slurries in the laboratory and field. For freshly mixed slurry, this test method may be used as an indicator of mix proportions. For in-trench slurry, a certain value may be specified for maintaining trench stability.

NOTE 1—The quality of the result produced by this standard depends on the competence of the personnel performing it and the suitability of the equipment and facilities being used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with Practice D3740 does not in itself ensure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some of those factors.

## 6. Apparatus

6.1 *Mud Balance*—Any instrument of sufficient accuracy to permit measurement within  $\pm 0.01 \text{ g/cm}^3$  may be used, however, the mud balance is the instrument generally used (see Fig. 1). The mud balance consists of a mud cup attached to one end of a beam which is balanced on the other end by a fixed counterweight and a rider free to move along a graduated scale. A level bubble is mounted on the beam. Attachments for extending the range of the balance may be used.

## 7. Calibration

7.1 The instrument should be calibrated frequently with fresh water. Fresh water should give a reading of  $1.00 \text{ g/cm}^3$  at  $20^\circ\text{C}$ . If it does not, adjust the balancing screw or the amount of lead shot in the well at the end of the graduated arm as required.

## 8. Procedure

8.1 Set up the instrument base approximately level.