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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Density of Bentonitic Slurries[1]

This standard is issued under the fixed designation D 4380; 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.

ε[1] NOTE—Editorial changes were made throughout and Section 12 was added editorially in September 1993.

1. Scope

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

1.2 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 653 Terminology Relating to Soil, Rock, and Contained Fluids[2]

2.2 *American Petroleum Institute (API) Standard:*

API RP 13B Recommended Practice Standard Procedure for Testing Drilling Fluids (Section 1)[3]

3. Terminology

3.1 For definitions of terms relating to this test method, refer to Terminology D 653.

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 provides for the determination of 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.

6. Apparatus

6.1 *Mud Balance*—Any instrument of sufficient accuracy to permit measurement within ±0.01 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 g/cm^3 at 70°F (21.1°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.

8.2 Fill the clean, dry cup with slurry to be tested, place the cap on the cup, and rotate the cap until firmly seated. Make sure some of the slurry is expelled through the hole in the cap to free trapped air or gas.

8.3 Wash or wipe the excess slurry from the outside of the cup.

8.4 Place the beam on the support and balance it by moving the rider along the graduated scale. The beam is horizontal when the leveling bubble is on the center line.

8.5 Read the density at the side of the rider toward the knife edge. Make appropriate corrections when a range extender is used.

8.6 Clean and dry the instrument thoroughly after each use.

9. Calculation

9.1 To convert the density to other units, use the following relationships:

$$\rho \text{ in g/cm}^3 = \text{specific gravity (numerically), or} \quad (1)$$

$$\rho \text{ in lb/ft}^3 = (\rho \text{ in g/cm}^3)\ 62.43, \text{ or}$$

$$\rho \text{ in lb/gal} = (\rho \text{ in g/cm}^3)\ 8.35$$

10. Report

10.1 Record the density to the nearest 0.01 g/cm^3.

[1] This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.20 on Impermeable Barriers.

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[2] *Annual Book of ASTM Standards*, Vol 04.08.

[3] Available from the American Petroleum Institute, 2101 L St., NW, Washington, DC 20037.