



Standard Test Method for Sand Content by Volume of Bentonitic Slurries¹

This standard is issued under the fixed designation D4381/D4381M; 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 the determination of the sand content of bentonitic slurries used in slurry construction techniques. This test method has been modified from API Recommended Practice 13B.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard. The SI units are given in brackets.

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.*

2. Referenced Documents

2.1 ASTM Standards:²

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 Fluids³

3. Terminology

3.1 Definitions:

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

¹ This test method is under the jurisdiction of ASTM Committee **D18** on Soil and Rock and is the direct responsibility of Subcommittee **D18.04** on Hydrologic Properties and Hydraulic Barriers.

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² 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.

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

4. Summary of Test Method

4.1 The glass measuring tube of the sand-screen set (**Fig. 1**) is filled with bentonitic slurry and water to the appropriate marks and is shaken. The mixture is poured through the wet screen. The funnel is fitted over the top of the screen and the assembly inverted, inserting the tip of the funnel into the glass measuring tube. All material is washed from the screen and the amount of sand read in the graduated tube, as percent by volume.

5. Significance and Use

5.1 This test method is used to determine the amount of sand by volume in bentonitic slurry. The significance of this test method mainly relates to bentonitic slurries used for concrete wall construction. The range of measurement is too limited for use in cement bentonite wall construction.

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 *Sand-Content Set* (see **Fig. 1**), consisting of the following:

6.1.1 *Sieve*, No. 200 mesh (75- μm), 2 in. [50 mm] in diameter.

6.1.2 *Funnel*, to fit screen and glass measuring tube.

6.1.3 *Measuring Tube*, glass tube should be marked from 0 to 20 % by volume.

NOTE 2—Volume of sand, including void spaces between grains, is measured and expressed as percent by volume of bentonitic slurry.

7. Procedure

7.1 Fill the glass measuring tube to the designated mark with bentonitic slurry.

7.2 Add water to the next designated mark.

7.3 Close the mouth of the tube and shake vigorously.

7.4 Pour the mixture into the clean, wet No. 200 (75- μm) mesh sieve.



NOTE 1—Photo courtesy of N. L. Baroid—N. L. Industries, Inc., Houston, TX.

FIG. 1 Sand-Content Set

7.5 Discard the liquid that passes through the sieve.

7.6 Add more water to the tube, shake, and pour into the sieve. Repeat until the water which passes through the sieve is clear.

7.7 Wash the sand retained on the sieve to clean any remaining slurry.

7.8 Attach the funnel upside down over the top of the sieve.

7.9 Carefully invert the assembly and insert the tip of the funnel into the mouth of the glass measuring tube.

7.10 With a fine spray of water, wash the sand retained on the sieve back into the measuring tube.

7.11 Allow the sand to settle.

7.12 Read the volume of sand from the graduations on the glass tube as a percent of the volume of bentonitic slurry originally added in 7.1.

7.13 Wash and dry all equipment thoroughly after each test.

8. Report: Test Data Sheet(s)/Form(s)

8.1 Record as a minimum the following general information (data):

8.1.1 Sample/specimen identifying information, such as location, project, date and time, the source of the slurry tested, such as its station and depth, person who conducted the test, and general testing conditions.

8.2 Record as a minimum the following sand content data:

8.2.1 The sand content of the slurry to the nearest percent.

9. Precision and Bias

9.1 *Precision*—Test data on precision is not presented due to the nature of this test method and the bentonite slurry-sand mixture. Having ten or more agencies participate in an in situ testing program at a given site is either not feasible or too costly at this time.

9.1.1 Subcommittee D18.04 is seeking any data from the users of this test method that might be used to make a limited statement on precision.

9.1.2 The results of this test obtained at a given site by a single operator are usually within 1-2 %.

9.2 *Bias*—There is no accepted reference value for this test method. Therefore, bias cannot be determined.

10. Keywords

10.1 bentonite; sand; slurry

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