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AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
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Standard Test Method for Wet Volume of Asbestos[1]

This standard is issued under the fixed designation C 1122; 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 appraisal of asbestos fiber groups 4 to 7[2] in terms of their occupied volumes when immersed in water.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.* See Section 7.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water[3]
D 2590 Test Method for Sampling Chrysotile Asbestos[4]
D 2946 Terminology Relating to Asbestos[4]
D 3639 Test Method for Classification of Asbestos Fibers by Quebec Standard Test[4]
D 3879 Test Method for Sampling Amphibole Asbestos[4]
E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods[5]

2.2 *Other Standard:*

Quebec Standard Designation of Chrysotile Asbestos Grades[6]

3. Terminology

3.1 *Definitions*—Refer to Terminology D 2946.

4. Summary of Test Method

4.1 A test specimen is dispersed in water by means of a mechanically driven inverter. The resulting suspension is then allowed to stand for a fixed period, and the volume occupied by the fiber, as defined by the solid-liquid interface, is recorded.

5. Significance and Use

5.1 Wet volume gives an indication of the degree of loftiness and openness of asbestos fiber.

6. Apparatus

6.1 *Graduated Glass Cylinder*[7]—Meeting the following specification, as shown in Fig. 1:

6.1.1

Capacity	2 dm^3(2000 cm^3)
Subdivisions	0.02 dm^3(20 cm^3)
Inside diameter	80 cm
Wall thickness	3 mm
Total height	482 ± 3 mm
Height from inner bottom of base to the 2000 cm^3 mark	398 ± 6 mm

6.1.2 The cylinder must have a full-width mouth reinforced with an exterior beaded rim, without any spout.

6.1.3 The bottom of the graduated cylinder must be flat and must form a clean right angle with the wall of the graduate.

6.2 *Mechanically Driven Inverter*, for rotating the graduated cylinder about a horizontal axis at the center of the graduated cylinder at 30 rpm for 30 complete rotations. The inverter may clamp the cylinder in such a way as to seal the mouth, or separate stoppers may be used provided the latter do not project inside the cylinder (see Fig. 2 and Fig. 3).

7. Hazards

7.1 When handling asbestos use reasonable precautions to avoid creating dust. Prolonged or frequent breathing of significant concentrations of airborne asbestos dust may cause serious bodily harm.

8. Sampling, Test Specimens, and Test Units

8.1 *Sampling*:

8.1.1 Select a sample in accordance with Test Methods D 2590, in the case of chrysotile asbestos, or D 3879 in the case of amphibole asbestos.

8.2 *Test Specimens*:

8.2.1 Refer to Table 1 for specimen sizes required. Take two specimens in each case.

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[1] This test method is under the jurisdiction of ASTM Committee C-17 on Fiber-Reinforced Cement Productsand is the direct responsibility of Subcommittee C17.03 on Asbestos–Cement Sheet Products and Accessories.

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[2] Quebec Standard designation of chrysotile asbestos grades as determined by Test Method D 3639.

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] *Annual Book of ASTM Standards*, Vol 04.05.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

[6] Available from the Asbestos Institute, 1130 Sherbrooke St. West, Ste. 410, Montreal, QC Canada H3A 2M8.

[7] Graduate cylinders supplied by the Scientific Glass Apparatus Co., Inc., 735 Broad St., Bloomfield, NJ 07003, or their equivalent, have been found satisfactory for this application.

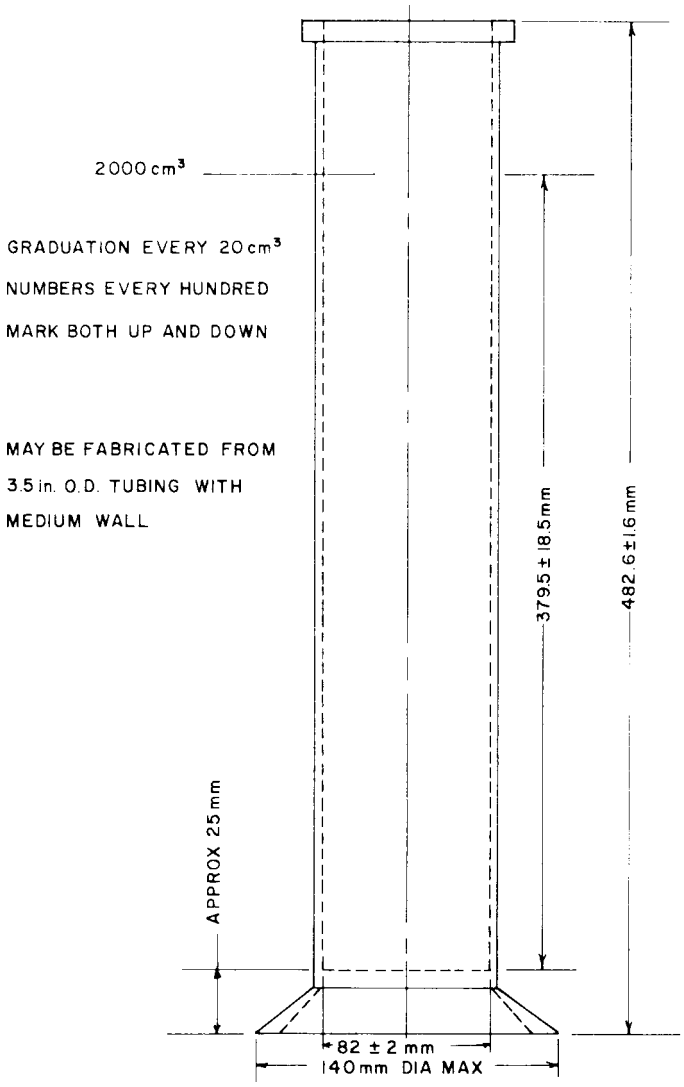

FIG. 1 Graduated Cylinder

FIG. 2 Mechanically Driven Inverter

9. Procedure

9.1 Fill the cylinder with distilled water[8] or Type IV reagent water as defined in Specification D 1193, at 25 ± 2°C (77 ± 3°F) to the 1000 cm ^{3} mark of the cylinder.

9.2 Pour the test specimen into the cylinder and add distilled or reagent water to the 2000 cm^3 mark.

9.3 Clamp the cylinder on the mechanical inverter and rotate through 6.3 rad (360°) 30 times in one min. Let stand for 10 min and then repeat the rotation cycle.

9.4 Remove the cylinder and place carefully on a levelled vibration free table.

9.5 Record the wet volume of the fiber suspended in water in cm^3 after 7.2 ks (2 h) for Groups 4, 5, and 6 fibers, and after 14.4 ks (4 h) for Group 7 fibers.

9.6 Repeat the test until two concordant volumes are observed on the sample as required in 11.1.

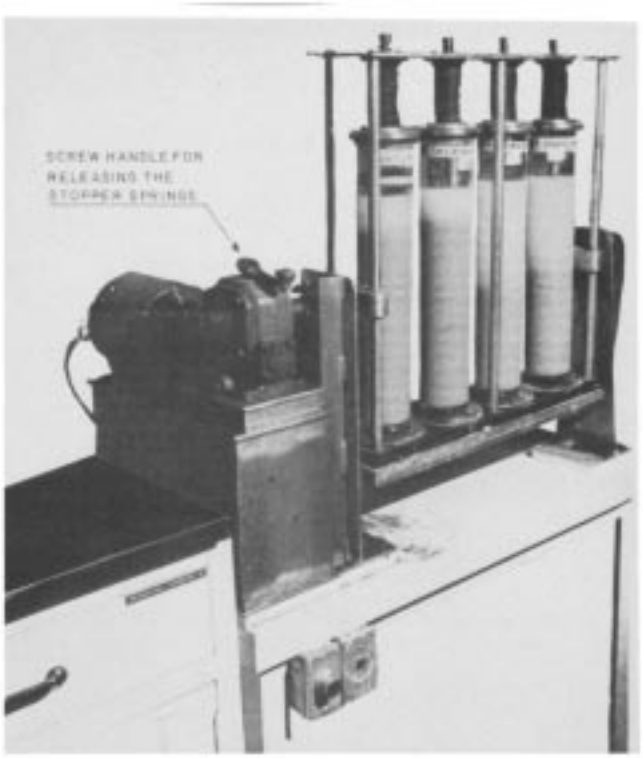

FIG. 3 Alternative Design of Mechanically Driven Inverter

TABLE 1 Specimen Size and Test Duration

Group[2] No.	Specimen weight, g	Sedimentation time	
		ks	h
4 to 6	30 ± 0.1	7.2	2
7	20 ± 0.1	14.4	4

10. Report

10.1 Report the average of two acceptable results expressing the wet volume in units of cm^3(or mL).

10.2 Fully identify the samples as to grade and origin.

11. Precision and Bias [9]

11.1 Results are acceptable if the difference in wet volume of the two specimens does not exceed ±5 %.

[8] It is recognized that clean water from different locations may affect results slightly. Therefore, when results from one laboratory will be compared with the results of another laboratory, distilled water should be used.

[9] Supporting data is available from ASTM Headquarters. Request RR: C17-1001.

11.2 *Precision*:

11.2.1 The single-laboratory multi-apparatus-operator-day precision (repeatability) is± 4 % (two sigma limits expressed in units of percentage) (2S %) as defined in Practice E 177 over the wet volume range from 306 to approximately 1700 cm^3.

11.2.2 A partial verification of the repeatability that confirmed the above data, RR: C17-1001 is on file at ASTM Headquarters, and a copy is available upon request.

11.3 *Bias*:

11.3.1 No justifiable statement can be made on the bias of this test method since the true value of the wet volume cannot be established by an accepted referee test method.

12. Keywords

12.1 asbestos; bulk; buoyancy; volume; wet bulk; wet volume