Designation: C1123/C1123M – 90 (Reapproved 2015)

Standard Test Method for Compressibility and Recovery of Asbestos[1]

This standard is issued under the fixed designation C1123/C1123M; 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 bulking factor of spinning grade fiber. These include grade 4A and longer.[2]

1.2 Results obtained on other grades may be considered as an evaluation of their bulk fiber resilience.

1.3 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.

1.4 **Warning—**Breathing of asbestos dust is hazardous. Asbestos and asbestos products present demonstrated health risks for users and for those with whom they come into contact. In addition to other precautions, when working with asbestos-cement products, minimize the dust that results. For information on the safe use of chrysoltile asbestos, refer to "Safe Use of Chrysotile Asbestos: A Manual on Preventive and Control Measures."[3]

1.5 *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.* For specific hazard warning, see 1.4.

2. Referenced Documents

2.1 *ASTM Standards:*[4]

D2590 Test Method for Sampling Chrysotile Asbestos

D2946 Terminology for Asbestos and Asbestos–Cement Products

D3879 Test Method for Sampling Amphibole Asbestos (Withdrawn 2009)[5]

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

3. Terminology

3.1 *Definitions:*Terms relating to asbestos are found in Terminology D2946.

4. Summary of Test Method

4.1 The height of a weighed specimen obtained in compliance with sampling Test Methods D2590 or D3879 is determined under a heavy ram in a graduated cylinder. The ram is then removed and the height of the specimen is again measured. Measurements are repeated until no change is noted in the readings.

4.2 The heights of the specimen under pressure, and after pressure release, are termed "compression" and "recovery," respectively. The percentage difference is reported as "percent recovery."

5. Significance and Use

5.1 The value of compression (as described in 9.5) is proportional to the bulk under moderate pressure.

5.2 The value of percent recovery is a measure of springiness or bulk fiber resilience.

6. Apparatus

6.1 *Graduated Cylinder and Weighed Ram*, as described in Fig. 1.

NOTE 1—The scale shall be calibrated in SI units, and alternatively in other units.

7. Hazards

7.1 **Warning**—see 1.4.

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

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[2] QAMA standard designation of chrysolite asbestos grades. Available from Asbestos Institute, 1130 W. Sherbrooke St., Suite 410, Montreal, QC Canada, H3A 2M8.

[3] Available from The Asbestos Institute, http://www.chrysotile.com/en/sr_use/manual.htm.

[4] 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.

[5] The last approved version of this historical standard is referenced on www.astm.org.

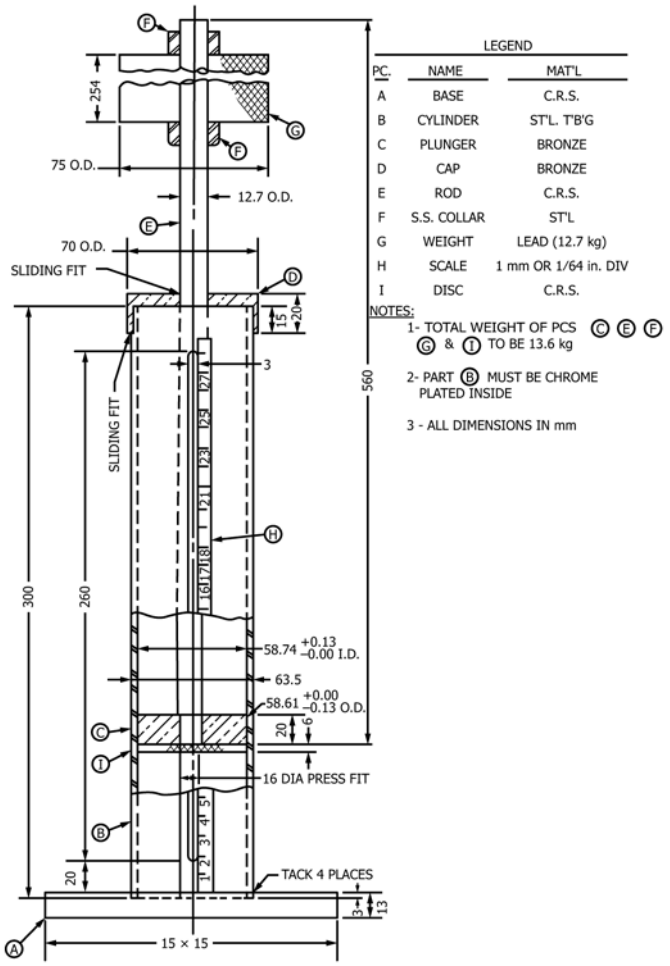

FIG. 1 Compressibility and Recovery Apparatus

8. Sampling, Test Specimens, and Test Units

8.1 *Sampling*—Take samples in accordance with Test Method D2590 in the case of chrysotile asbestos, or Test Method D3879 in the case of amphibole asbestos.

8.2 *Test Specimens*—Take two specimens of 113.4 ± 0.1 g [4± 0.005 oz] each.

9. Procedure

9.1 Pour a specimen into the graduated cylinder.

NOTE 2—It may be advantageous to use a wide-mouth funnel for pouring the specimen.

NOTE 3—It may be necessary to obstruct the observation slot in the wall of the graduated cylinder while pouring in the shorter fibered, and the more free-flowing grades of asbestos, to prevent specimen loss. This may be done by wedging a wooden rod of appropriate thickness and length, into the slot. Take care that the obstruction does not project inside the cylinder.

9.2 Fit the ram and cap assembly into position and simply allow the ram to compress the specimen under the force of gravity for 60 s (1 min).

9.3 If the observation slot was obstructed during specimen admission, remove the obstruction. Note the height of the specimen at the end of the 60 s dwell period to the nearest 0.5 mm [±1⁄64 in.].

NOTE 4—It is permissible at this point in the procedure to insert a thin pointer, such as a needle, through the observation slot, and to let this rest atop the asbestos surface to facilitate reading the scale with precision.

9.4 Upon removal of the ram, the height of the specimen may change. Note this new height, to the same precision.

9.5 Repeat the compression cycle until the released measurement, and measurements under pressure, become constant. Record these measurements as recovery and compression, respectively.

9.6 Repeat 9.1 – 9.5 for the second specimen.

10. Calculation

10.1 Calculate percent recovery as follows:

$$\text{Percent Recovery} = (\text{Recovery} - \text{Compression}) \times 100/\text{Compression} \quad (1)$$

10.2 Calculate the average compression and the average percent recovery for both specimens and determine the deviation from the average in each case.

11. Report

11.1 Fully identify the sample as to designation and origin.

11.2 Report average compression for the two acceptable specimens to ± 0.5 mm [±1⁄64 in.].

11.3 Record the average of two concordant results and report the percent recovery to the nearest 0.5 %.

12. Precision and Bias

12.1 *Acceptable Results*—If the deviation for either determination from the average result exceeds 5 %, then test additional specimens until a pair of specimens meet these criteria, and accept only the latter.

12.2 *Precision:*

12.2.1 Based upon a study carried out in 1972 at one laboratory on spinning grades only, the following measures of precision were established, as defined in Practice E177.

12.2.1.1 Repeatability, meaning single-laboratory-apparatus multi-operator-day precision, was established at 28.1 % (relative difference two-sigma limits in percent (RD2S%)) for percent recovery over the range from 8 to 14 % recovery.

12.2.1.2 Repeatability was 3.43 % (relative difference two-sigma limits in percent (RD2S%) for compression over the range from 79 to 104 mm [3⁹⁄64 to 4⁷⁄64 in.] of compression.

12.3 *Bias*—No justifiable statement on the bias can be made since the true values cannot be established by an accepted referee method.

13. Keywords

13.1 asbestos; bulk resilience; bulking factor; compressibility; compressibility and recovery; recovery; resilience; springiness