



Standard Test Methods for Air Permeability of Asbestos Fibers¹

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1. Scope

1.1 These test methods cover the measurement of the relative degree of openness or degree of fiberization of milled asbestos fiber by air permeability instruments.

1.2 Method A is the recommended procedure and describes a determination by means of the Rapid Surface Area apparatus. This test method is limited to fibers with an effective surface area in the range from 10 to 250 dm²/g (490 to 12 000 ft²/lb).

1.3 Method B is an alternative procedure and covers the use of the Dyckerhoff apparatus. This test method is limited to fibers within the range from 10 to 600 Dyckerhoff seconds.

1.4 Only those asbestos specimens which are of similar specific gravities will bear strict comparison by these air permeability methods since differences in density result in specimens being tested under different conditions of porosity.

1.5 Samples containing excessive quantities of nonfibrous particles or contaminants will not give reliable or meaningful results.

1.6 The values stated in SI units are to be regarded as the standard. The inch-pound units in parentheses are provided for information only.

1.7 *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:

D 2590 Test Method for Sampling Chrysotile Asbestos²

D 3879 Test Method for Sampling Amphibole Asbestos²

E 11 Specification for Wire-Cloth Sieves for Testing Purposes³

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods³

2.2 Other Standards:

NNN-P-1475B Federal Specification for Paper, Filter, Analytical⁴

3. Summary of Test Methods

3.1 In both test methods the resistance to air flow of a compressed specimen of fixed weight and volume is determined.

3.2 Test Method A:

3.2.1 The apparatus is arranged so that the total resistance to air flow remains equal to a fixed hydraulic pressure head. Total resistance includes the resistance of the specimen and the pressure drop across a calibrated capillary tube of known resistance. The contribution of the specimen to total resistance is measured on a manometer calibrated in specific surface area units.

3.2.2 Optional calibration of the manometer in equivalent Dyckerhoff seconds, which are the units of Test Method B, permits comparison of results by both test methods on the same basis.

3.3 Test Method B:

3.3.1 The time required to draw a given volume of air through the specimen under specified conditions of varying hydraulic head is determined. This time is taken as a measure of the air permeability of the specimen.

4. Significance and Use

4.1 The degree of fiberization or subdivision of the asbestos fiber bundles in a specimen is related to its resistance to air flow. The number and size of the pores in the specimen are a function of the size of the fiber bundles and determine the resistance to air flow through the plug. Test specimens that have undergone a higher degree of fiberization will yield higher results provided the specimens compared are of similar specific gravities and other properties are not markedly different.

4.2 These test methods are suitable for specification acceptance, manufacturing control, development, and applied research.

4.3 It must not be assumed that all test specimens with equal test results have undergone equivalent degrees of fiberization. Some types of asbestos fiberize more readily than others.

¹ These test methods are under the jurisdiction of ASTM Committee C17 on Fiber-Reinforced Cement Products and are the direct responsibility of Subcommittee C17.03 on Asbestos-Cement Sheet Products and Accessories.

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² Annual Book of ASTM Standards, Vol 04.05.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.