



Standard Methods for Gas Flow Resistance Testing of Filtration Media¹

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1. Scope

1.1 The flow resistance of any fabricated filter device will depend on the flow resistance of the media used.

1.2 This standard offers procedures sufficient to determine the gas flow characteristics of flat specimens of media used in the filtration process. The methods are extended to include pleated specimens and bulk media as well.

1.3 In all cases, flow rates through the specimen are determined in accordance with procedures outlined in ASME “Fluid Meters.” The test fluid is air.

1.4 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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

D461 Test Methods for Felt (Withdrawn 2003)³

D585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product (Withdrawn 2010)³

D645/D645M Test Method for Thickness of Paper and Paperboard (Withdrawn 2010)³

D685 Practice for Conditioning Paper and Paper Products for Testing

D737 Test Method for Air Permeability of Textile Fabrics

D1776 Practice for Conditioning and Testing Textiles

D1777 Test Method for Thickness of Textile Materials

D2905 Practice for Statements on Number of Specimens for Textiles (Withdrawn 2008)³

¹ These methods are under the jurisdiction of ASTM Committee D22 on Air Quality and are the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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

D3574 Test Methods for Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams

E105 Practice for Probability Sampling of Materials

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

2.2 ASME Document:

“Fluid Meters,” Sixth Edition, 1971⁴

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *air density*, ρ —mass per unit volume.

3.1.2 *air flow resistance*, ΔP —pressure drop or pressure differential across a test specimen of filter medium at a specified air face velocity or mass flow rate.

3.1.3 *constituted bulk media*—those types of filter media formed from bonded aggregates or discrete solid materials.

3.1.4 *edge leakage*—air flow that passes into or bypasses the test specimen in geometric planes other than those intended for resistance measurement.

3.1.5 *face area*, A —cross-sectional area perpendicular to air flow at the specimen test boundary.

NOTE 1—If specimen inlet and exit face areas are different, “Inlet” or “Exit” shall be used to describe the face area in question.

3.1.6 *face velocity*, V —volumetric flow rate per unit face area.

NOTE 2—If specimen inlet and exit face areas are different, “Inlet” or “Exit” shall be used to describe the face velocity in question.

3.1.7 *mass rate of flow*, $\dot{m}$ —mass transport of air per unit time through the test specimen.

3.1.8 *medium area*, A_m —total area of filtration media exposed to air flow.

NOTE 3—Medium area may be greater than face area due to pleating, folding, etc.

3.1.9 *medium velocity*, V_m —volumetric flow rate per unit medium area.

3.1.10 *normalized resistance*, $\sigma \Delta P$ —product of sigma and measured air flow resistance.

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.