



Standard Test Method for Measuring Air Performance Characteristics of Vacuum Cleaners¹

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1. Scope

1.1 This test method covers procedures for determining air performance characteristics of commercial and household upright, canister, stick, hand-held, utility, and combination-type vacuum cleaners having provisions for attaching a hose and incorporating a series universal motor. This test method can be applied to the carpet cleaning mode of operation.

1.2 These tests and calculations include determination of suction, airflow, air power, maximum air power, and input power under standard operating conditions (see Note 1). The nozzle mounted on plenum testing is an ideal air performance measurement and is not intended to represent the actual air performance during carpet or floor cleaning.

NOTE 1—For more information on air performance characteristics, see Refs (1-6).²

1.3 The foot-pound-inch system of units is used in this standard. The values in parentheses are given for information only.

1.4 This standard may involve hazardous materials, operations, and equipment. *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.* A specific precautionary statement is given in Note 2.

2. Referenced Documents

2.1 ASTM Standards:

E 1 Specification for ASTM Thermometers³

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods⁴

E 691 Practice for Conducting an Interlaboratory Study to

Determine the Precision of a Test Method⁴

F 395 Terminology Relating to Vacuum Cleaners⁵

F 431 Specification for Air Performance Measurement Plenum Chamber for Vacuum Cleaners⁵

2.2 AMCA Standard:

210-85 Laboratory Methods of Testing Fans for Rating⁶

3. Terminology

3.1 Definitions:

3.1.1 *air power, AP, W, n*—in a vacuum cleaner, the net time rate of work performed by an air stream while expending energy to produce an airflow by a vacuum cleaner under specified air resistance conditions.

3.1.2 *automatic bleed valve, n*—any device a part of a vacuum cleaner's design which automatically introduces an intentional leak within the vacuum cleaner's system when manufacturer specified conditions are met.

3.1.3 *corrected airflow, Q, cfm, n*—in a vacuum cleaner, the volume of air movement per unit of time under standard atmospheric conditions.

3.1.4 *input power, W, n*—the rate at which electrical energy is absorbed by a vacuum cleaner.

3.1.5 *model, n*—the designation of a group of vacuum cleaners having the same mechanical and electrical construction with only cosmetic or nonfunctional differences.

3.1.6 *population, n*—the total of all units of a particular model vacuum cleaner being tested.

3.1.7 *repeatability limit (r), n*—the value below which the absolute difference between two individual test results obtained under repeatability condition may be expected to occur with a probability of approximately 0.95 (95 %).

3.1.8 *repeatability standard deviation (S_r), n*—the standard deviation of test results obtained under repeatability conditions.

3.1.9 *reproducibility limit (R), n*—the value below which the absolute difference between two test results obtained under reproducibility conditions may be expected to occur with a probability of approximately 0.95 (95 %).

¹ This test method is under the jurisdiction of ASTM Committee F11 on Vacuum Cleaners and is the direct responsibility of Subcommittee F11.22 on Air Performance.

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² The boldface numbers in parentheses refer to the list of references appended to this test method.

³ *Annual Book of ASTM Standards*, Vol 14.03.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ *Annual Book of ASTM Standards*, Vol 15.08.

⁶ Available from Air Movement and Control Association, 30 West University Dr., Arlington Heights, IL, 60004.