



Standard Test Method for Evaluating the Sustained Air Performance and Exhaust Emission Efficiencies of Central Vacuum Cleaning Units¹

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1. Scope

1.1 This test method is a laboratory test for determining the sustained air performance and Exhaust Emissions of a central vacuum cleaner when tested under laboratory conditions.

1.2 This test method is applicable to all central vacuum cleaners with or without any type of internal filter. This test method is intended to help indicate how performance may be affected after multiple times of vacuuming over an extended period of time.

1.3 The inch-pound system of units is used in this standard except for weight measurements, which are measured in grams. The values stated in parentheses are given for information only.

1.4 *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:²

- E1 Specification for ASTM Liquid-in-Glass Thermometers
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
- F820 Test Method for Measuring Air Performance Characteristics of Central Vacuum Cleaning Systems

2.2 ISO Standard:³

- ISO 5011 Inlet Air Cleaning Equipment for Internal Combustion Engines and Compressors—Performance Testing

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 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 Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.

3. Terminology

3.1 Definitions:

3.1.1 *exhaust emissions*—measure of the efficiency of a unit to capture the loading media. Exhaust Emissions is $(1 - (\text{the weight of the media exhausted into the exhaust emissions bag, divided by the weight of the media introduced}) \times 100)$.

3.1.2 *input power, W, n*—the rate at which electrical energy is absorbed by a vacuum cleaner motor/fan system.

3.1.3 *model, n*—the designation of a group of vacuum cleaner systems having the same mechanical and electrical construction.

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

3.1.5 *sample, n*—a group of vacuum cleaner systems taken from a large collection of vacuum cleaner systems of one particular model, which serves to provide information that may be used as a basis for making a decision concerning the larger collection.

3.1.6 *seal vacuum*—a water lift reading for a power unit when the inlet is entirely closed or sealed.

3.1.7 *standard air density, ρ_{std} , lb/ft³, n*—atmospheric air density of 0.075 lb/ft³ (1.2014 Kg/m³).

3.1.7.1 *Discussion*—This value of air density corresponds to atmospheric air at a temperature of 68°F (20°C), 14.696 psi (101.325 kPa), and approximately 30 % relative humidity.

3.1.8 *suction, inches of water, n*—in a vacuum cleaner system, the absolute difference between ambient and sub-atmospheric pressure.

3.1.9 *sustained air performance, n*—the ability of a vacuum cleaner to maintain air performance with a known quantity of media aspirated into unit throughout a number of feeding cycles.

3.1.10 *test run, n*—the definitive procedure that produces the singular result.

3.1.11 *test station pressure, B_p , inches of mercury, n*—for a vacuum cleaner system, the absolute barometric pressure at the test location (elevation), and test time.

3.1.11.1 *Discussion*—It is not the equivalent mean sea level value of barometric pressure typically reported by the airport and weather bureaus. It is sometimes referred to as the