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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Motor Life Evaluation of a Canister, Head-held, Stick, and Utility Type Vacuum Cleaner Without a Driven Agitator[1]

This standard is issued under the fixed designation F 1038; 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 is limited to evaluation of canister, hand-held, stick, and utility type vacuum cleaners without a driven agitator.

1.2 This test method provides a test to determine operating life of the motor, before servicing is needed, by an accelerated laboratory procedure. The motor is tested while mounted and is operated in a vacuum cleaner.

1.3 The values as stated in inch-pound units are to be regarded as the standard. The values 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:*

E 337 Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet-Bulb and Dry-Bulb Temperature)[2]

F 431 Specification for Air Performance Measurement Plenum Chamber for Vacuum Cleaners[3]

F 608 Laboratory Test Method for Evaluation of Carpet-Embedded Dirt Removal Effectiveness of Household Vacuum Cleaners[3]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *failure*—when motor stoppage occurs. This may be due to failure of an armature assembly, field assembly, housing(s), bearings, motor cooling fan and primary air moving fan or both, brush assemblies, motor mounted non-resetable thermal protection devices or any other component judged to be integral with the motor.

3.1.2 *motor life*—the time at which any failure of the motor occurs.

4. Significance and Use

4.1 The test results provide an indication of the motor life of an electric vacuum cleaner in operating hours. The end of the motor life will be judged in accordance with Section 3.

5. Apparatus and Materials

5.1 *Voltage Regulator*—The regulator must be capable of maintaining the vacuum cleaner's rated voltage± 2 % with a waveform that is essentially sinusoidal with 3 % maximum harmonic distortion for the duration of the test.

5.2 *Voltmeter*, to provide measurements accurate to ±1 %.

5.3 *Timer and Switch*—The timer and switch will have the capacity to control on/off duty cycle of the vacuum cleaner during the life test.

5.4 *Sharp Edge Orifice Plate*—The orifice, 0.75 in. (19.05 mm) in diameter, shall be in accordance with the figure illustrating orifice plate detail in Specification F 431.

5.5 *Wattmeter*, to provide measurements accurate to ±1 %.

5.6 *Plenum Chamber*, in accordance with the plenum chamber described in Specification F 431.

5.7 *Water Manometer*, or equivalent instrument measuring in increments of 0.1 in. (2.54 mm).

5.8 *Thermometer*, having a range of at least 18 to 80°F (-8 to +27°C) and graduated in 1°F (0.5°C) increments.

5.9 *Psychrometer*—The psychrometer shall meet the requirements of Test Method E 337 with thermometers in increments of 1°F (0.5°C).

5.10 *Test Fixture*—Any suitable surface that will support the vacuum cleaner in the normal operating position.

6. Sampling

6.1 Test a minimum of three units (or a larger sample size if desired) of any model. Select all samples at random in accordance with good statistical practice. Results shall provide an 80 % confidence level within ±10 % of the mean value. If not, test additional samples or reduce the results by the penalty factor as calculated in 7.8.1.

7. Procedures for Motor Life Evaluation

7.1 Determine initial performance as follows:

7.1.1 Connect the manometer (or equivalent) to the plenum chamber. Install a clean filter in the test vacuum cleaner before conducting performance tests. (This is not required for units which do not use filters).

[1] This test method is under the jurisdiction of ASTM Committee F-11 on Vacuum Cleaners and is the direct responsibility of Subcommittee F11.30 on Durability-Reliability.

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[2] *Annual Book of ASTM Standards*, Vol 11.03.

[3] *Annual Book of ASTM Standards*, Vol 15.07.