ANSI/AHRI Standard 681-2015 (R2023) (SI)

2015 (R2023) Standard for

Performance Rating of Residential Air Filter Equipment

Approved by ANSI on 13 June 2023

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ICS Code: 27.200

Note:

This standard supersedes ANSI/AHRI Standard 681(SI)-2009.

For I-P ratings, see ANSI/AHRI Standard 680-2015 (R2023) (I-P).

This standard was approved as an American National Standard (ANS) on 13 June 2023.

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PERFORMANCE RATING OF RESIDENTIAL AIR FILTER EQUIPMENT

Section 1. Purpose

1.1 *Purpose*. The purpose of this standard is to establish for residential Air Filter Equipment: definitions; classifications; test requirements; rating requirements; minimum data requirements for Published Ratings; operating requirements; marking and nameplate data; and conformance conditions.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope*. This standard applies to factory-made Air Filter Equipment and Air Filter Media, as used in such equipment, for removing particulate matter, when used in environmental conditioning of inhabited spaces in residential facilities. The standard evaluates the "combined" performance of Air Filter Equipment in all aspects: Initial Resistance, Final Resistance, particle size efficiency, and Dust Holding Capacity. This offers both the user and specifier a complete view of the Air Filter Equipment for comparison purposes.

2.2 *Exclusions*. This standard does not apply to the following:

2.2.1 Air Filter Equipment and Air Filter Media for removing particulate matter, when used in industrial or commercial processes not associated with environmental conditioning of inhabited space.

2.2.2 Air Filter Equipment when used in removing abnormally high concentrations of specific contaminants.

2.2.3 Portable appliances which include Air Filter Equipment in combination with fans, coils, dampers, etc., but can be applied to the Air Filter Equipment as used therein.

2.2.4 Commercial and industrial Air Filter Equipment covered by ANSI/AHRI Standard 851 (SI).

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the ASHRAE Wikipedia website (https://www.ashrae.org/technical-resources/authoring-tools/terminology) unless otherwise defined in this Section.

3.1 *Air Filter Equipment.* Air cleaning equipment used for removing particulate matter.

3.2 *Air Filter Media.* The part of the Air Filter Equipment, which is the actual particulate removing agent. In the case of Group RII equipment (Section 4), the terms charging section and/or collecting section shall be used.

3.3 *Dust Holding Capacity.* The amount of dust captured on the Air Filter Equipment. Dust Holding Capacity shall be established at the Maximum Rated Airflow Rate of the Air Filter Equipment as published by the manufacturer.

3.4 *Final Resistance.* The resistance of the Air Filter Equipment operating at its Maximum Rated Airflow Rate, at which the test is terminated and result calculated.

3.5 *Initial Resistance.* The resistance of the Air Filter Equipment operating at its rated range of airflow rates with no dust load per Section 5.4.1.

3.6 *Loading Dust.* A compound synthetic dust used for Air Filter Equipment loading. It is composed, by weight, of 93.5% ISO fine test dust (ISO Standard 12103-1, A2 Fine Test Dust) and 6.5% milled cotton linters (CAS# 9004-34-6).

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3.7 *Maximum Rated Airflow Rate*. The highest airflow rate at which the Air Filter Equipment is operated as published by the manufacturer.

3.8 *Particle Size Efficiency*. The fraction (percentage) of particles that are captured on the Air Filter Equipment. Particle Size Efficiency shall be measured in three particle size ranges: 0.3-1.0, 1.0-3.0, 3.0-10 microns. Particle Size Efficiency shall be established at the Maximum Rated Airflow Rate of the equipment as published by the manufacturer.

3.9 *Published Rating.* A statement of the assigned values of those performance characteristics, under stated Rating Conditions, by which a unit may be chosen to fit the application. These values apply to all units of like nominal capacity and type (identification) produced by the same manufacturer. As used herein, the term Published Rating includes the rating of all performance characteristics shown on the unit or published in specifications, advertising or other literature controlled by the manufacturer, at stated Rating Conditions.

3.9.1 *Application Rating*. A rating based on tests performed at application Rating Conditions (other than Standard Rating Conditions).

3.9.2 *Standard Rating*. A rating based on tests performed at Standard Rating Conditions.

3.10 *Rating Conditions*. Any set of operating conditions under which a single level of performance results and which causes only that level of performance to occur.

3.10.1 *Standard Rating Conditions*. Rating Conditions used as the basis of comparison for performance characteristics.

3.11 *Sealing Means*. Edge seals to prevent air bypass under rated operating conditions.

3.12 *"Shall" or "Should."* "Shall" or "should" shall be interpreted as follows:

3.12.1 *Shall.* Where "shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.12.2 *Should.* "Should" is used to indicate provisions which are not mandatory but which are desirable as good practice.

3.13 *Standard Equipment.* The minimum assembly of components required to qualify equipment within one of the classification groups.

3.14 *Support*. The means necessary to place the Air Filter Media in the air stream and to prevent air bypass around the filter assembly under maximum rated operating conditions.

3.15 *Test Aerosol.* A polydisperse solid-phase (i.e., dry) potassium chloride (KCl) granules generated from aqueous solution, used in this standard to determine Particle Size Efficiency of the air cleaning equipment.

Section 4. Classifications

4.1 *Groups*. For the purpose of this standard, Air Filter Equipment and Air Filter Media are classified into groups:

4.1.1 Group RI - Panel or Pleated
4.1.2 Group RII - Electronic air cleaner
4.1.3 Group RIII - Air Filter Media (for Group RI)

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